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## CONTENTS

	PAGE
Syndromes leading to enucleation . . . . .	<i>B. A. Klien</i> 1193
Reconstruction of the lids . . . . .	<i>W. L. Hughes</i> 1203
Penetrating injuries of the eye. . . . .	<i>W. F. Moncreiff and K. J. Scheribel</i> 1212
Relationship between visual acuity and refractive error in myopia . . . . .	<i>J. S. Crawford, C. Shagass, and T. J. Pashby</i> 1220
Resection of inferior oblique muscle in hypotropia . . . . .	<i>O. H. Wagman</i> 1226
Unusual type of corneal opacities. . . . .	<i>J. W. Henderson and D. R. Gillespie</i> 1236
A new permanent hand magnet . . . . .	<i>B. S. Brodsky</i> 1245
Uveoparotid fever with bilateral papilledema . . . . .	<i>W. L. Roberts and R. F. Nielsen</i> 1252
Carcinoma of choroid metastatic from the lip . . . . .	<i>E. Goodsitt</i> 1256
Refraction clinic . . . . .	<i>A. E. Sloane</i> 1259
Simple rubber form for reconstruction of contracted socket. . . . .	<i>L. V. Johnson</i> 1260

## DEPARTMENTS

Society Proceedings . . . . .	1261
Editorials . . . . .	1268
Correspondence . . . . .	1274
Abstracts . . . . .	1277
Pan-American Notes . . . . .	1305
News Items . . . . .	1307

For complete table of contents see advertising page V

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# AMERICAN JOURNAL OF OPHTHALMOLOGY

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## CHRONIC POSTTRAUMATIC SYNDROMES LEADING TO ENUCLEATION\*

BERTHA A. KLIEN, M.D.

Chicago

It has often been stated that chronic nonspecific infiltrating iridocyclitis (iritis serosa) is the most frequent and important posttraumatic condition leading to enucleation on suspicion of sympathetic ophthalmia. The results of the studies reported in this paper show that there are several other conditions in this category, some of which are equally important or frequent.

The 77 eyes included in this study were selected from a total of 219 eyes with penetrating injuries received for histopathologic examination during the past 15 years. Eyes injured so severely that they had to be removed within a few days of the trauma, those which, although quiescent, were removed years later for purely cosmetic reasons, and those which clinically presented an obvious suppurative intraocular process were omitted from this study.

The eyes selected for this study had in common a chronic low-grade painful state of irritation or inflammation, which at the time of their removal invariably raised a suspicion of sympathetic ophthalmia.

These eyes are classified into two general groups as follows: (1) Those in which the terminal inflammation was

continuous with the immediate post-traumatic reaction (table 1), and (2)

TABLE 1

GROUP 1. TERMINAL INFLAMMATION FOLLOWING POSTTRAUMATIC REACTION WITHOUT QUIESCENT INTERVAL

Type of Lesion	A*	B†	Special Remarks
Chronic septic endophthalmitis	20	16 wks.	3 foreign bodies (plant, glass)
Extensive tissue necrosis	6	5½ wks.	
Sympathetic ophthalmia	3	5 wks.	One (glass and hair)

\* Number of cases.

† Average interval between injury and enucleation.

TABLE 2

GROUP 2. QUIESCENT INTERVAL BETWEEN POSTTRAUMATIC REACTION AND TERMINAL INFLAMMATION

Types of Lesion	A*	B†
Sympathetic ophthalmia	3	22 wks.
Chronic infiltrating iridocyclitis	17	50 wks.
Endogenous iridocyclitis	4	
Chronic hemophthalmos	6	42 mos.
Epithelial implant	9	7 yrs.
Cyst of new Descemet's membrane	2	
Rupture of degenerated lens	1	
Retinal disinsertion, late iritis	6	12 yrs.

\* Number of cases.

† Average interval between injury and enucleation.

those in which a quiescent interval varying from several weeks to years preceded the activated state of inflammation which prompted their removal (table 2).

\* From the College of Medicine, University of Illinois. Read before the Chicago Ophthalmological Society, March 19, 1945, as part of a symposium on eye injuries.

Some of the clinical as well as histopathologic features of the aforementioned conditions will be discussed.

#### GROUP 1

(a) *Chronic mild septic endophthalmitis*. The clinical course was characterized by moderate photophobia and pain, and moderate to marked ciliary injection of the injured eyes. Whenever examination of the deeper structures was possible there was some visibility of the slitlamp

(b) *Extensive tissue necrosis*. In these six eyes the penetrating injury (two by rocks, one each by buckshot, BB shot, wood, golf club) was accompanied by marked contusion. Clinically the predominant finding was a complete hyphema which remained stationary throughout the time of observation, without any signs of absorption. Two of these eyes developed blood staining of the cornea, three a secondary glaucoma.

Histologically the most striking feature

TABLE 3  
SYMPATHETIC OPHTHALMIA (6 CASES)

Patient	Age	Type of Injury	A*	B†	Second Eye
B. C.	28	Glass	None	5 wks.	Normal
G. S.	37	Scleral rupture (fist)	None	3 wks.	Normal
J. M.	4	Glass	None	5 wks.	Precip. 4 da.
J. H.	10	Auto accident	3 wks.	6 wks.	Precip. 10 da.
B. F.	67	Unknown	?	1 yr.	Aq. cells 1 da.
J. C.	21	Glass	4 wks.	10 wks.	Precip. 4 da.

\* Quiescent interval between posttraumatic reaction and first symptom.

† Time interval between injury and enucleation.

beam in the aqueous and occasionally a moderate increase in the number of free cells but no corneal precipitates, in contradistinction to the infiltrating iridocyclitis in which precipitates were abundant.

The histologic picture was characterized by a localized focus of polymorphonuclear leucocytic exudate somewhere along the intraocular path of the penetrating scar, which, depending on the length of time between injury and enucleation, was walled off by a more or less well-developed fibrous capsule. In several cases the abscess was inside the injured lens, well walled off from the other tissues by lens capsule and cortex. In three instances, a foreign body (plant, glass, unidentified) was found within the encapsulated abscess. There were mainly round cells in the other intraocular tissues.

Should such an eye not be removed an atrophía bulbi with retinal detachment would be the expected outcome.

was necrosis of large portions of the uveal tract and the retina, and free hemorrhage into some or all of the intraocular chambers. There was also mild infiltration with lymphocytes and monocytes of the tissues bordering on the necrotic parts.

Such extensive areas of tissues disintegration exert apparently a chemotactic stimulus upon surrounding vascular beds and upon wandering cells in the adjoining tissues, which result in migration and proliferation of various phagocytes and white blood cells, accumulations of which infiltrate in and around the necrotic areas. Extensive tissue necrosis also interferes with the various mechanisms for the absorption of hemorrhage, which ordinarily are very efficient, especially in the young, and often bring about regression of a hemophthalmos in a surprisingly short time. A hemophthalmos following a penetrating injury with a sharp, cutting



object would therefore seem to have a better prognosis as to absorption of the hemorrhage and restitution of some vision, than that resulting from a perforating trauma with an element of contusion.

(c) *Sympathetic ophthalmia*. The accompanying table (table 3) illustrates

*thalmia*. The exciting eyes were removed in two cases four days after precipitates developed in the fellow eye, in one case one day after, and in one case not more than 10 days after this occurrence.

#### GROUP 2.

(a) *Chronic posttraumatic infiltrating*



Fig. 1 (Klien). C, cross section of cilia in iris, chronic infiltrating iritis.

that three of the six cases of sympathetic ophthalmia had no quiescent interval between injury and enucleation. In the other three the quiescent intervals were three weeks, four weeks, and one year, respectively. In four of these patients the fellow eye was involved at the time of enucleation. These four include the three eyes with a quiescent interval, a fact which suggests greater vigilance over eyes with the type of injury which assertedly often leads to sympathetic oph-

*thymia*. Clinically the interval between the traumatic reaction and the appearance of the corneal precipitates in the injured eye is short, usually 8 to 14 days.

The histopathologic findings in this condition have been described in great detail by E. Fuchs,<sup>1</sup> A. Fuchs,<sup>2</sup> and Samuels.<sup>3</sup> The main characteristic is an iris densely packed with lymphocytes, or a mixture of lymphocytes and plasma cells and a relative absence of inflamma-

tory changes in the ciliary body, even in those instances in which such are found in the posterior segment, where they consist of an infiltration in the retina similar to that in the iris.

The etiology of this condition has been

uveitis on histologic examination. In both, the uveitis was bilateral, beginning in the injured eye, and a physical reexamination revealed marked sensitivity to tuberculin. In two other cases the eye had suddenly become painful and inflamed after 7 years

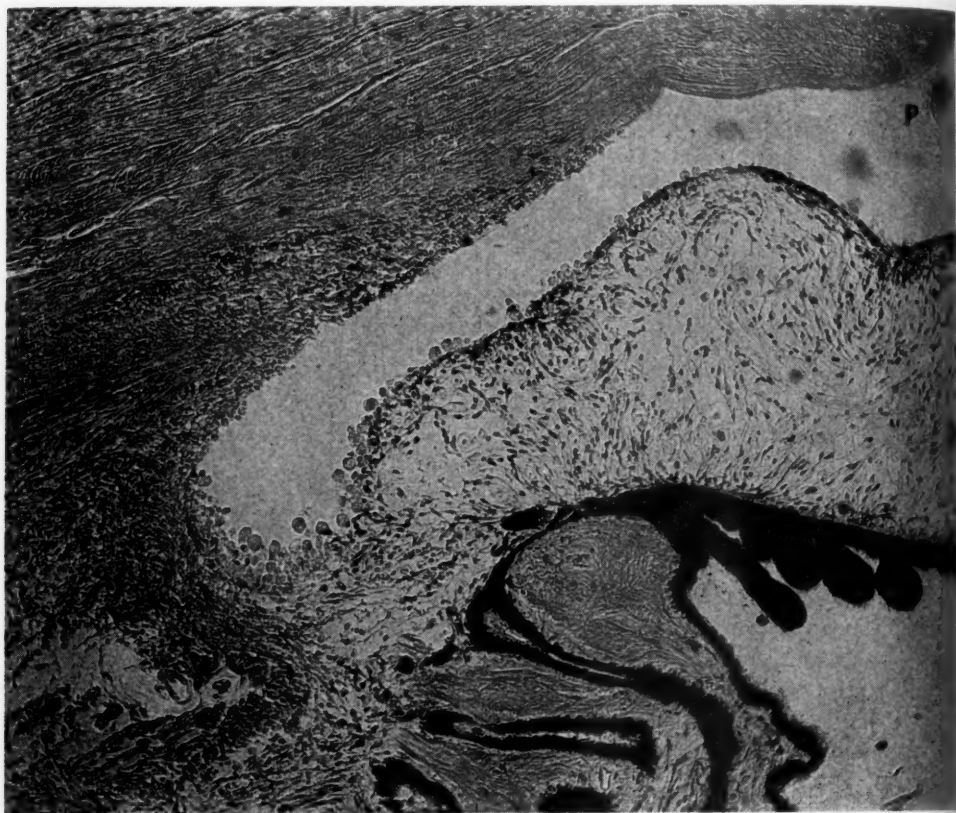


Fig. 2 (Klien). Endogenous iritis in eye injured 40 years ago. P, precipitate.

much discussed but has never been fully clarified. Samuels pointed out the high incidence of open lens injuries and considers it possibly identical with the phacoanaphylactic inflammation of Verhoeff and Lemoine.<sup>4</sup>

In our series of 17 eyes only two had no open lens injury. In one of these two a group of six cilia was imbedded in the iris (fig. 1).

(b) *Endogenous iritis*. Two of these cases were found to have a tuberculous

and 40 years, respectively, in both patients during an attack of influenza, the eye representing perhaps a locus minoris resistentiae. There were corneal precipitates in both, and an acute rise of tension to 80 mm. Hg (Schiotz) in one of them. The latter eye had a peripheral anterior synechia over one quarter of the circumference, due to an adherent leucoma, and a hypermature cataract, factors which may have precipitated the rise of tension. Figure 2 illustrates the narrow but open

anterior-chamber angle in this eye, which was enucleated seven days after the onset of the inflammation. Clumps of swollen round cells line the surfaces and infiltrate the trabeculum and the stroma of iris and ciliary body.

(c) *Chronic hemophthalmos.* The

foreign body could be demonstrated, but there was a profuse intraocular hemorrhage. After several weeks the patient was discharged with the right eye quiescent and with vision of only light perception. During the following four years there were several recurrent attacks of

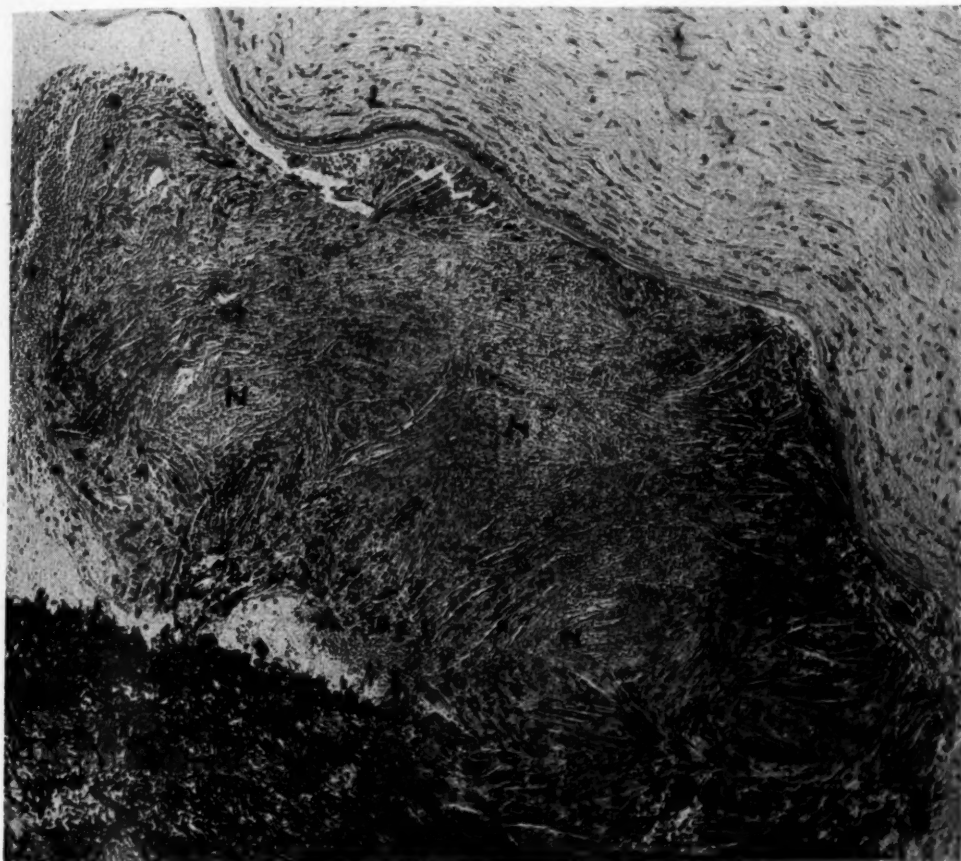


Fig. 3 (Klien). Cholesterol tumor in anterior chamber. N, necrotic areas. L, polymorphonuclear leucocytic infiltration in cornea.

course of this condition is well illustrated by the following case history: O. T., a boy aged 13 years, sustained an injury to his right eye by a piece of glass from an exploding bottle, which resulted in two perforations: one in the lower third of the cornea, and one in the superior sclera 1.5 cm. from the limbus. No intraocular

pain and redness in this eye, which always quieted promptly after atropinization. At the time of the enucleation, four years after the injury, vision with the right eye was nil. There were marked photophobia and ciliary injection of the bulb. Through the upper clear two thirds of the cornea a conglomerate mass of yel-

lowish refractile bodies was visible in the anterior chamber, and numerous small refractile bodies were suspended in the aqueous and were considered to be cholesterol crystals. There were no corneal precipitates, and the intraocular pressure had not been elevated at any time. The blood cholesterol level was within normal limits.

Histologic examination verified the

ent infiltration with polymorphonuclears just in front of Descemet's membrane. In the iris and ciliary body there was only slight round-cell infiltration. The lens was cataractous and had been partly absorbed. There was a complete retinal detachment due to an extensive disinsertion.

In attempting to project the histologic findings into the known clinical picture



Fig. 4 (Klien). Multiple cholesterol tumors between ciliary processes.

clinical diagnosis of cholesterol in the anterior chamber. The tumefaction (fig. 3) consisted of clumps of foreign-body giant cells, monocytes, and some round cells and fibroblasts around empty slit-like spaces, which always indicate cholesterol needles *in vivo*. Similar but smaller cholesterol tumors were applied here and there to the anterior surface of the iris, and to the ciliary processes and valleys (fig. 4). In the central portion of the large cholesterol tumor in the anterior chamber there were several necrotic areas surrounded by some polymorphonuclear cells. In the portion of the cornea adjoining this tumefaction there was an incipi-

one comes to the conclusion that the attack of pain and redness just prior to the enucleation was caused by disintegration of portions of the large cholesterol tumor, the toxicity of the by-products of this process leading to an aseptic infiltration of the mass and the adjoining cornea with polymorphonuclears, similar to the infiltration in ring abscess of the cornea, which is also a purely toxic manifestation. The intermittent attacks of pain and redness of this eye during the four-year period of observation, which were so easily controlled with atropine, may have been due to irritation of the ciliary processes and the iris by the sharp cholesterol



crystals in the early stages of their formation before giant cells were able to surround them and render them less irritating.

In the series of six eyes with chronic

cholesterin were removed because of recurrent attacks of pain and complete loss of light perception after a period of  $2\frac{1}{2}$  and 4 months, respectively. Extensive retinal disinsertions with complete hem-



Fig. 5 (Klien). Epithelial implantation cyst. D, detached and new-formed Descemet's membrane.

hemophthalmos, four showed extensive formation of cholesterol tumors and other findings similar to those just described. The two hemophthalmic eyes without

ophthalmos and, in one of them, iridodialysis, were found histologically. No note of the intraocular pressure was made clinically in either instance.

(d) *Epithelial implants.* Secondary glaucoma, which is considered the most frequent complication of epithelial implants, was present in only three of the nine eyes. In the remaining six, the implants in some cases extended through part of the anterior chamber and also parts of the more posterior structures, whereas in other cases they were entirely within the iris, lens, or posterior chamber, forming cysts filled with fluid and cell

trating scar at the inferior nasal limbus. The nasal half of the anterior chamber was filled with a cystic body whose temporal wall was glistening and wrinkled, and was considered to be detached or new-formed Descemet's membrane. The size of the cyst varied on different days, and the number and depth of the parallel folds of its temporal wall changed with its size. The aqueous was clear, the lens cataractous, the intraocular pressure nor-



Fig. 6 (Klien). Cyst of Descemet's membrane. E, endothelogenous connective tissue.

debris. The following case, which was also observed clinically, is characteristic:

G. B., a woman 48 years of age, had incurred a penetrating injury of the left eye with a stick of wood at the age of four years. After the initial posttraumatic inflammation had subsided, there was no pain nor redness of this eye until seven weeks prior to the enucleation. Vision with the left eye was light perception and correct projection. There were mild ciliary injection of the bulb, and an old pene-

mal throughout the period of observation.

Histologically the cyst was revealed to be an epithelial implantation cyst, whose temporal wall (fig. 5) was formed by partly detached and partly new-formed Descemet's membrane. The main part of the cyst was embedded in the iris, where it was multilocular and partly surrounded by foci of lymphocytic infiltration. These foci were the only inflammatory manifestation in the entire eye. There was no

evidence of glaucoma in either the anterior or the posterior segment. The state of this eye at the time of the enucleation was that of an irritation rather than an inflammation, perhaps due to a varying amount of traction exerted upon the iris root and its nerves by the cyst in its variable stages of fullness.

A different type of cyst is illustrated in figure 6. The wall of this cyst consists

with the left eye remained impaired, but there was no pain nor redness of this eye afterward until three weeks prior to the enucleation, when the patient noted a white mass in the eye.

Vision was now nil, there was ciliary injection of the bulb, the anterior chamber was deep and filled with a vibrating mass of iridescent pearls, which were interpreted as Elschnig's globules—that is,

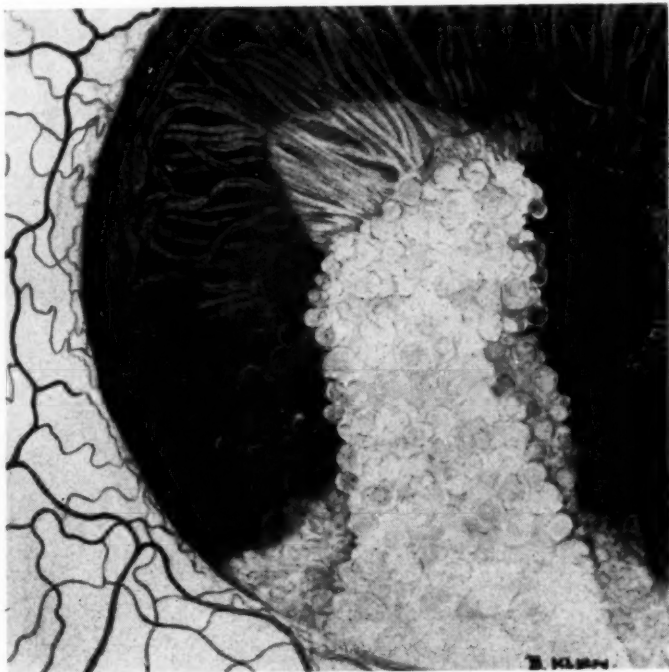


Fig. 7 (Klien). Elschnig's pearls in anterior chamber.

entirely of Descemet's membrane and endothelogenous connective tissue.

(e) *Rupture of degenerated lens.* Another interesting illustration of an eye with an old penetrating injury which became suddenly troublesome is the following case, which also was observed in detail clinically:

L. L., a man 70 years of age, had received, at the age of 30 years, a perforating injury of the left eye by a piece of steel that was at once removed. Vision

profusely proliferated and degenerated lens-epithelium cells—and which protruded partly from the pupil, partly from a hole in the iris (fig. 7). Here and there, between the iridescent beads, there were highly refractile needles. The intraocular pressure was normal.

Histologic examination revealed a partly calcified lens with a ruptured capsule and surrounding masses of proliferated vesicular lens epithelium, fatty granular cells, and slitlike spaces (after cholesterolin

crystals) in the posterior chamber, anterior vitreous, and anterior chamber. Figure 8 illustrates chains and clumps of small, partly collapsed cystic bodies in the angle of the anterior chamber, representing old Elschnig globules, all of which have lost the nucleus and consist only of a very attenuated wall.

Liberation of degenerated and irritating substances by an apparently spon-

tachment, a type of iritis usually classified as toxic.

#### SUMMARY AND CONCLUSIONS

Among the inflammatory and other posttraumatic chronic conditions that led to the enucleation of the 77 eyes reported in this series, nonspecific infiltrating iridocyclitis, far from being the most frequent condition encountered, occurred in



Fig. 8 (Klien). Histologic view of Elschnig's globules (G) in chamber angle. Same case as figure 7.

taneous rupture of the lens capsule produced the state of irritation which led to the removal of this eye.

(f) *Extensive retinal disinsertion and detachment.* Six eyes exhibited this condition, in which a mild late iritis necessitated enucleation. Histologically the iritis was revealed to be an unspecific infiltrating type and was considered secondary to the long-standing retinal de-

only 17 eyes, or 22 percent. More frequent was chronic septic endophthalmitis, in 20 eyes or 26 percent. Four other conditions comprised more than one third of all the cases; namely, epithelial implants (12 percent), chronic hemophthalmos, extensive contusion necrosis, and late toxic iritis after longstanding retinal detachment (8 percent each). Endogenous iridocyclitis occurred in 5 percent, and



some rarer conditions totaled 3 percent. Sympathetic ophthalmia itself occurred in only 6 eyes or 8 percent (less than 3 percent of the 219 penetrating injuries).

There were no findings in any of the eyes in this series to suggest that they

could have been saved. Even though there are no suggestions for the therapist it is hoped that some points of interest to the clinician as well as the pathologist have been brought out.

58 East Washington Street (2).

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#### RECONSTRUCTION OF THE LIDS\*

WENDELL L. HUGHES, M.D.  
*Hempstead, New York*

For the purpose of this presentation, only those cases in which replacement of all the layers of one or both lids is required will be considered. It is necessary to reconstruct all or part of the lower lid much more frequently than the upper because of: (1) the more exposed location of the lower lid; the upper orbital margin and tissues of the brow serving to provide greater protection for the upper lid from trauma, and, (2) the much greater frequency of malignancy in the lower lid.

Whether the lid is absent through trauma or because of surgical removal the problems involved are the same. The term blepharopoiesis is applied to the procedure of reconstruction of the lid where all or a major portion of it is entirely absent. A basic principle can be stated at the outset; namely, that when it is necessary to provide new lid structures nothing replaces lid tissue so well as lid tissue itself, both functionally and cosmetically.

The lids may be divided, for surgical purposes, into two layers: the outer, con-

sisting of all the tissues down to, but not including, the tarsus; and the inner, consisting of tarsus and conjunctiva. Each of the layers has its epithelial covering—namely, skin and conjunctiva—each of which is important functionally: the skin, to provide a thin flexible external covering, and the conjunctiva, for a smooth mucous-membrane lining internally as a protection to the cornea.

When it becomes necessary to replace these layers it can readily be done by a sliding or a free graft from one of the other lids, provided, of course, relatively normal lid tissue can be found either in the opposing lid or the lids of the opposite eye.

Fortunately a lower lid, which it is more frequently necessary to rebuild, is more easily fashioned than the upper, since (1) the tissues needed may usually be obtained from the opposing upper lid, (2) it is smaller in size, and also (3) the main muscle of the lower lid, the various fibers of the orbicularis, are relatively unimportant functionally, so that one does not need to be concerned with its motility. For a proper result, in the upper motility must be carefully preserved.

\* This article is based on a paper read before the Pittsburgh Ophthalmological Society.

### I. LOWER-LID RECONSTRUCTION

For total reconstruction of a lower lid many methods have been advocated, using pedicle and sliding flaps from the skin of the face (nearby) such as the methods of Dieffenbach,<sup>1</sup> Fricke,<sup>2</sup> Imre,<sup>3</sup> and others. A pedicled graft of skin of the arm has been used, as in the Italian method, in which the arm is placed above the head and a pediclé graft so planned that the skin at the end of it may be used for the eyelid. The arm is securely fastened over the head for 10 to 14 days before the pedicle is severed. The skin provided by these methods is, of course, much thicker and less flexible than is normal lid skin. Several surgeons have devised methods using tissues of the opposing upper lid (Landolt,<sup>4</sup> Valude,<sup>5</sup> Dutemps,<sup>6</sup> Wheeler<sup>7</sup>) with much better results. Tissues of the ear have been used as free graft (Büdinger<sup>8</sup>).

#### A. IF OPPOSING UPPER LID IS NORMAL

When it becomes necessary to reconstruct the major portion of the lower lid, the creation of each of the two layers must be planned. In the absence of pathologic change in the opposing upper lid, the inner tarso-conjunctival portion of the new lower lid may be obtained by splitting this lid into its two component layers and pulling down the inner layer which remains attached to the conjunctiva of the fornix and to the levator tendon above at the upper tarsal margin. The lower border is denuded of its epithelium and attached to the conjunctiva of the lower fornix, thus completing the future inner layer.

Frequently, sufficient skin remains in the lower lid to provide the outer layer. The outer layer of the upper lid is fastened in place so that the lashes occupy their normal position in comparison to the position of the lashes of the opposite up-

per lid when the lids are closed. This is so planned that the lashes will be at the level of the middle of the tarsus which has been brought down from the upper lid. The skin from below is brought up and attached to the anterior part of the lower half of the tarsus and united to the lower border of the skin of the upper lid from which the upper lashes spring. Later, lashes are provided for the new lower lid and then the incision for the new interpalpebral fissure is carried out.<sup>9</sup>

**DESCRIPTION OF OPERATION IN THREE STAGES.** *First stage.* In case of carcinoma the entire thickness of the lower lid is removed, the skin and subcutaneous tissues being severed well below the margin of the tumor mass and the conjunctiva in or near the lower fornix. Laterally, the incision is carried well beyond the diseased tissue, leaving, if possible, the temporal canthus and the canthal ligament undisturbed; and medially, just temporal to the punctum lacrimalis, when it is uninvolvement. This leaves a large defect in which the new lower lid is constructed. The upper lid is split transversely into two layers, the incision being started along the lid margin slightly posterior to the white line, the dissection proceeding upward, hugging the superficial layer of the tarsus to a point even with the upper fornix, and well above (about 3 to 4 mm. above) the upper margin of the tarsus. The dissection should not disturb the attachment of the levator to its upper border. Considerable care must be taken to avoid the roots of the lashes in this dissection. The inner layer is then comprised of the tarsus with its conjunctiva. The outer layer of the upper lid—namely, its skin and subcutaneous tissue with the lashes attached—is placed back in its original location. The lower epithelial border of the upper tarsus is excised, and this edge is united to the cut conjunctival margin in the lower

fornix by a fine continuous black-silk 000 suture, brought out externally at each end. The arrangement of the tissues is shown diagrammatically in cross-section in the illustrations in the original article describing this procedure.<sup>10</sup>

The skin of the cheek is undermined sufficiently to allow it to be brought upward to the level normally occupied by the lower lid, without tension. The undermined skin below is drawn upward and attached to the anterior surface of the lower half of the tarsus by means of three double-armed black-silk sutures, so that the upper border is midway between the upper and the lower border of the tarsus. The superficial layer of the upper lid is then attached to the anterior surface of the upper half of the tarsus in the same manner so that the lashes occupy a transverse straight line across the tarsus at its mid portion. The two edges of skin (the lash border of the upper lid and the upper edge of the skin pulled up from below) are aligned by a subcuticular stitch. The lashes of the upper lid are held upward against the skin of the lid by collodion so that the roots of the lashes will take an upward direction. After the collodion has dried a double layer of perforated cilkloid is put over the area, and a pressure dressing applied and left in place for four to six days. Subsequent dressings are changed at intervals of three to five days for three weeks. The eye is then left entirely closed by the complete blepharorrhaphy, except for a small space nasally at the medial canthus, until the final stage, a minimum of three months.

*Second stage.* At the end of six to eight weeks, transplantation of a hair-bearing strip of skin to supply lashes for the new lower lid is carried out. A transverse trough is dissected down to the tarsus immediately below and parallel to the lashes of the upper lid. A strip of hair-bearing skin to fit this trough is cut from the

lower portion of the opposite eyebrow and, its position being reversed so that the nasal end is placed nasally, is laid in the trough and sewn in position with minute black silk sutures. The hairs are then held down by collodion to the skin of the lower lid to start them growing in the proper direction. The lashes of the upper lid are similarly held up and a double layer of perforated cilkloid is put over the area. A pressure dressing is applied and left in position five to seven days. The dressing is changed at 5-day intervals and is removed in about three weeks.

The lashes in this strip usually fall out, and take about three months to grow again. The tarsal plate makes an excellent smooth base, and the additional raw tissues of the sides of the trough formed by the dissection supply ample mechanical and nutritional support for the graft. The proper direction of the lashes is accomplished, first, by turning the transplant so that the portion that was nasal in the right eyebrow is placed nasally in the left lower lid, and, second, by anchoring the hairs protruding from the graft to the skin below with collodion to hold their roots in the proper direction under the pressure dressing. The many fine sutures, which are placed very close to the edges of the skin and tied tightly, are picked off at the first and second dressings, one and two weeks later, respectively.

*Third stage.* After another 7 to 12 weeks, at least 3 months after the original operation, when it is seen that the transplanted lashes of the lower lid are growing properly and the lashes of the upper lid are complete, an incision is made transversely between the two rows of lashes through the skin and tarsus to open the interpalpebral fissure. The new lower lid is now complete. Every effort is made to preserve the lower punctum and the lacrimal canaliculus, to supply lacrimal

drainage if possible, but, of course, not at the expense of leaving any malignant tissue.

Variations of this procedure may need to be adopted depending on the conditions present.

#### B. IF THERE IS INSUFFICIENT SKIN

When there is insufficient skin below to reach freely up to the level of the middle of the tarsus, a free graft of full-thickness lid skin from the opposing or from the opposite upper lid is the method of choice. Occasionally, it may be necessary to use a split-skin graft from elsewhere in the body if good lid skin cannot be obtained.

#### C. IF THE TARSUS OF THE OPPOSING UPPER LID IS ABSENT

When the tarsus of the opposing lid is absent or badly deformed or diseased, the tarsus of the opposite upper lid with its covering of conjunctiva may be used. If the conjunctiva remaining on the lower part of the eyeball is insufficient to form the lower fornix, enough may be obtained by dissecting loose some of the conjunctiva of the fornix at the upper border of the tarsus to be removed and, leaving it attached to the upper border of the tarsus, using it for the lower fornix by reflecting it onto the eyeball. Sufficient conjunctiva may be obtained in this manner to supply a covering for the entire lower part of the eyeball as well as the newly planned lid. The opposing upper lid is split along its margin and the inner layer attached to the upper border of the transplanted tarsus in the lower lid. The lower edge of the outer layer of the upper lid—namely, the lash border—is attached to the skin brought up from below. A free graft of lid skin could, of course, not be placed over the free tarsal graft. Some sort of sliding or pedicle graft must be used to

provide nutrition for the transplanted tarsus.

#### D. IF ONLY A PORTION OF THE LOWER LID NEEDS REPLACEMENT

When only a portion of the lower lid needs replacement a corresponding portion of the tarsus of the opposing upper lid may be used in a manner similar to that described under IA.

### II. UPPER-LID RECONSTRUCTION

#### A. RECONSTRUCTION FOR ONE HALF OR LESS OF THE UPPER LID

When a portion of the upper lid must be reconstructed in its entire thickness, which amounts to more than one quarter

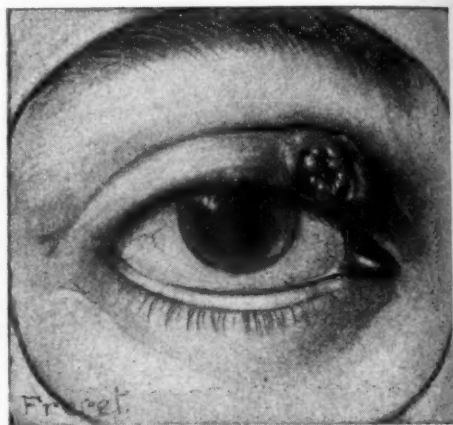


Fig. 1 (Hughes). Case of epithelioma involving the inner one quarter of the right upper lid, necessitating removal of a little over one third of the nasal portion of the upper lid throughout its entire thickness.

and less than one half of the lid structures, a sliding of the lid structures provides a very satisfactory result. This method is illustrated in the case of a malignancy of the nasal end of the upper lid (fig. 1) in which the nasal two fifths of the lid was removed in its entire thickness (fig. 2).



DESCRIPTION OF OPERATION IN THREE STAGES. *First stage.* The two layers of the missing portion were planned separately.

a. The tarso-conjunctival layer was provided by sliding all but a 2-mm. strip of the remaining tarsus along the margin of the lid, nasally into the coloboma. The remaining half of the lid was everted and an incision parallel to and 2 mm. from the lid margin was made through

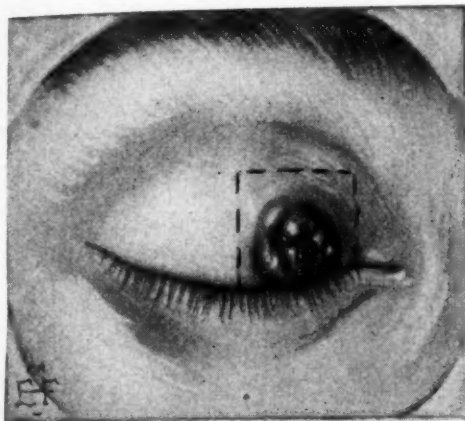


Fig. 2 (Hughes). Outline of area to be removed.

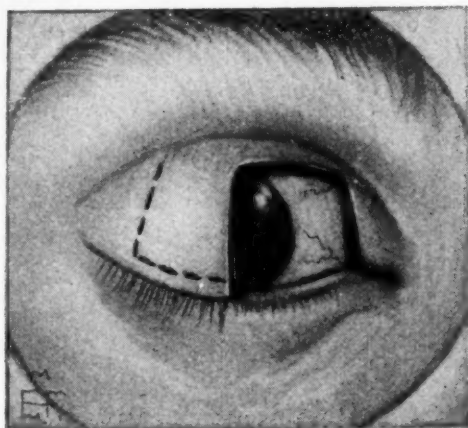


Fig. 3 (Hughes). Coloboma caused by removal. Dotted lines show the incision of the inside of the lid through the conjunctiva and tarsus. This section of tarsus remaining attached to the levator above, was mobilized and moved nasalward.

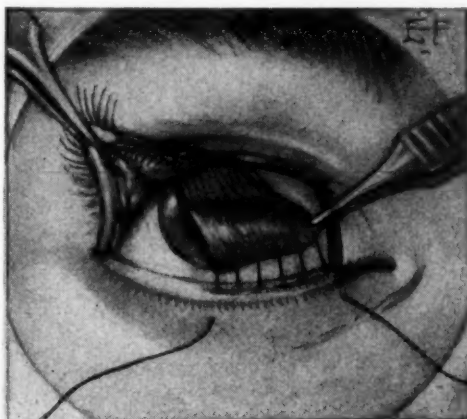


Fig. 4 (Hughes). Section of tarsus moved nasally and being attached to the lower lid.

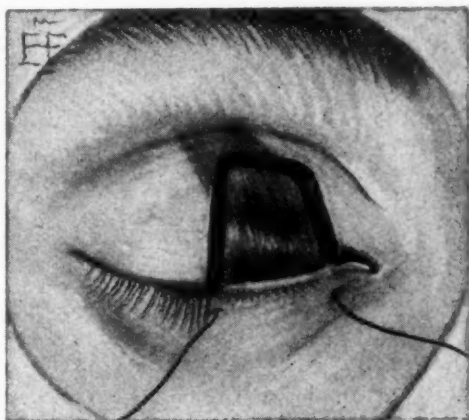


Fig. 5 (Hughes). Tarsus sewn in place, forming the inner layer of the lid in the area of the coloboma.

the conjunctiva and tarsus, extending to its lateral extremity (fig. 3). This piece of tarsus was dissected free from the superficial tissues of the lid, but the attachments of the conjunctiva in the upper fornix and the levator to the upper border were left intact. This piece of tarsus was then slid nasally and sewn in position (fig. 4). The conjunctiva in the upper fornix temporarily was freed and brought down to be attached to the remaining narrow marginal rim of tarso-conjunctiva.

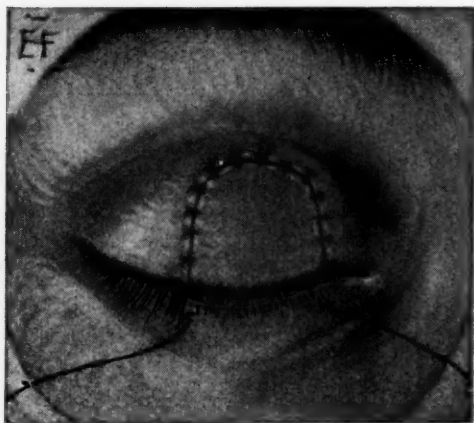


Fig. 6 (Hughes). Free graft of skin may be used as illustrated to provide outer layer of the upper lid.

The nasal extremity of the tarsal flap was attached nasally to the upper margin of the medial canthus and temporally was dovetailed into a small groove in the margin to provide an overlapping union with the remaining temporal portion of the lid margin. The portion of the lower lid opposite the coloboma was split into two layers and the inner tarso-conjunctival layers united by means of a continuous suture, brought out at each end to form a firm blepharorrhaphy (fig. 5).

b. The cutaneous layer can be provided in either of two ways. Sometimes the remaining skin of the lid can be rearranged to cover the defect. However, if there is insufficient skin to provide a satisfactory covering, a free graft of full-thickness skin from the opposite upper lid may be used, as illustrated (fig. 6). A double layer of perforated cilkloid was placed over the area and a pressure dressing applied. This was left in position for five days and changed at 5-day intervals for a total of three weeks.

*Second stage.* Two months later a lash transplant was done by dissecting down to the tarsus in the blepharorrhaphy and sewing in place a strip of hair-bearing

skin from the lower part of the nasal end of the eyebrow on the same side (fig. 7). A double layer of perforated cilkloid was applied and a pressure dressing changed at 5-day intervals for three weeks.

*Third stage.* In another 2½ months, when the hairs were seen to be growing, an incision was made between the two rows of lashes. Figures 8 and 9 show pre-operative and postoperative pictures, respectively, of a patient with carcinoma of the nasal end of the upper lid, in which this method was carried out. The growth involved the area around the medial canthus as well as the nasal one quarter of the lid. The nasal one third of the upper lid was removed.\*

#### B. TOTAL UPPER-LID RECONSTRUCTION

When total reconstruction of an upper lid is necessary, the problem is usually much more difficult, particularly because, as has been pointed out, movement of the lid must be provided as well as the replacement of the parts.

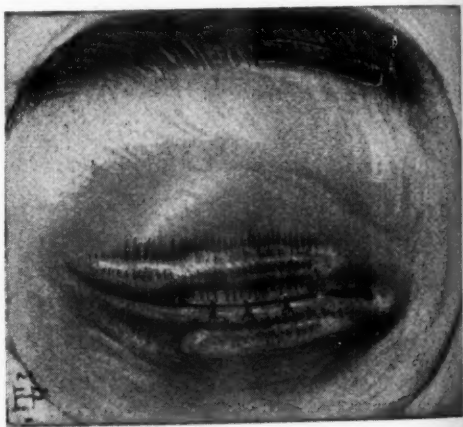


Fig. 7 (Hughes). Stage 2. Lash transplant. A strip of hair-bearing skin from the lower portion of the nasal end of the brow sewn in place in line with the lashes of the temporal portion of the lid.

\*I am indebted to Dr. Daniel B. Kirby for permission to report this case.

To provide the cutaneous layer a free graft of skin from the opposite upper lid may be necessary. In order that this graft may survive, the lower lid must be split and the tarso-conjunctiva drawn upward and its border united to what remains of the conjunctiva above the limbus. This serves to protect the cornea as well as to provide a vascular bed for the reception of the free graft of skin. Two months later the skin layer is dissected up, and a free graft of tarsus from the opposite upper lid is placed.<sup>11</sup>

If the opposing tarsus in the lower lid is sufficiently wide it may be used by reversing the method described for rebuilding a new lower lid. The drawn-up tarso-conjunctival layer may be sufficient to provide the inner layer for both upper and lower lids, so that no additional tarsus from the opposite upper lid will be necessary. Usually, however, the tarsus of the lower lid is too narrow and thin a struc-



Fig. 9 (Hughes). Postoperative result in patient operated on by the technique described for the condition shown in figure 8.

ture to provide a satisfactory tarsal plate for both lids. To provide tarsus for the new upper lid either tarsus or cartilage may be used as a free graft.

If the tarsus of the opposite upper lid is to be used it is removed with considerable conjunctiva attached to its upper border and is transplanted with its conjunctival surface toward the cornea. This provides a rigid plate to give proper form for the new upper lid. Two double-armed sutures are passed through from the conjunctival surface at the upper tarsal margin and brought out and tied externally to retain the upper fornix. At the same time or at a later date the tendon of the levator can frequently be isolated and brought down to be attached to the upper border and the anterior surface of the transplanted tarsus. Unless a satisfactory tarsal plate is provided, the upper lid usually appears too scanty and too highly arched, and the lids do not close properly during sleep, so that the cornea is more or less exposed.

Six or eight weeks later lashes may be supplied by transplanting a hair-bearing strip of skin from the lower part of the inner end of the brow on the same side.



Fig. 8 (Hughes). Case of carcinoma around the medial canthus extending through the nasal one quarter of the upper lid, necessitating removal of the nasal one third of the lid in its entire thickness.

These hairs usually provide a fairly good match for the hairs of the opposite upper lid. It is much more important and fortunately easier to provide cosmetically good lashes for the upper lid than for the lower.

When the lashes are seen to be growing well, usually after a period of another two or three months, the transverse incision to create a new lid fissure may be carried out.

### III. RECONSTRUCTION OF BOTH LIDS

When it becomes necessary to replace both upper and lower lids, such as in cases of severe burn with total necrosis, a serious problem confronts the surgeon. Of prime importance is the preservation of the eye, which consequently is frequently entirely unprotected. Usually there will be sufficient conjunctiva present to dissect up and bring the edges together from above and below to form primarily a protecting layer for the cornea over which may be placed a split-skin graft. The conjunctiva is, of course, reversed so that its epithelial surface is placed next the cornea. Because there is usually an extensive loss of skin in these cases, one can frequently not obtain sufficient normal lid skin for grafting purposes. In this type of case one must be content with a pair of lids that will not match the lids of the other eye in color. The split-skin graft from the arm or leg always remains whitish in color. If the skin is taken quite thin it usually, eventually becomes flexible. The tendon of the levator should be carefully preserved and attached to the conjunctiva as far down as is practicable, spreading it out as far as possible, and using fine buried sutures so as not to interfere with the healing of the graft.

If suitable tarsal tissue is available, it should be utilized for the inner layer. If not, a thin piece of cartilage from the ear

or rib should be inserted to provide some rigidity or body for the new lids. If this is done at the original operation a layer including the levator tendon should be brought down in front of the cartilage graft to separate it from the free split-skin graft and to provide nourishment for each of the free grafts (cartilage and skin). Otherwise the skin over this area would not receive nourishment and the corresponding portion would become necrotic. The cartilage must have some internal epithelial (not epidermal) covering, such as normal conjunctiva if available or mucous membrane from the mouth, if necessary. It is sometimes necessary to provide this by pregrafting a piece of buccal mucous membrane to the concavity of a portion of the ear cartilage. The ear cartilage with its adherent mucous membrane (representing the tarsus with its attached conjunctiva) is removed as a free graft after two or three weeks and inserted into the lid structure. The externally placed raw surface of the graft is covered with a layer of tissues which will provide nourishment.

In the case of total reconstruction of both upper and lower lids the blepharorrhaphy should remain intact for approximately one year (a minimum of nine months) before an interpalpebral fissure is made, in order to prevent subsequent contracture of the lids. If all bulbar conjunctiva as well as palpebral conjunctiva were destroyed, the eye would probably be so badly damaged as not to be worth saving. However, if it were thought that a useful eye could possibly be retained, thin grafts of mucous membrane from the mouth could be used to replace bulbar conjunctiva and further grafts could be placed into subcutaneous pockets nearby, which could later be used on the end of pedicle grafts to supply lids lined by this buccal mucous membrane.



## CONCLUSIONS

In each of the foregoing procedures it has been suggested that normal lid tissues be used to replace missing lid structures, whenever possible; when such tissues cannot be obtained, tissues should be supplied whose structure is as close to the original tissue as possible in regard to function, texture, color, thickness, and flexibility. In no case should epidermis be used for lining an upper lid where it may come directly in contact with the cornea, if the cornea of the eye is healthy, for it does

not provide a proper lining and may be the cause of complete loss of sight through corneal damage.

A second choice for lid tissues is: (a) For skin—split-skin graft, full-thickness skin from the cephalo-auricular angle as a free graft, or skin from nearby (rarely from chest or arm) used as a pedicle graft. (b) For conjunctiva—mucous membrane from the mouth or thin split skin when the vitality of the cornea is not a factor. (c) For tarsus—cartilage from ear or rib.

131 Fulton Avenue.

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## PENETRATING INJURIES OF THE EYE\*

### A STATISTICAL SURVEY

WILLIAM F. MONCREIFF, M.D., AND KARL J. SCHERIBEL, M.D.  
*Chicago*

During the five-year period from January 1, 1940, to December 31, 1944, a total of 691 patients with various types of injuries of the eyes and/or adnexa were hospitalized and cared for in the ophthalmologic department of the Cook County Hospital.

Of this number, 183 patients had penetrating injuries (including rupture) of the eyeball itself. The total number of eyes with such injuries was 185, since in two of the patients both eyes were injured on the same occasion. The present paper is concerned with a statistical survey of various facts, circumstances, and features encountered in this series of 185 consecutive and unselected penetrating eye injuries. While nothing essentially new is presented, it may be worth while, on occasion, to review some of our clinical experiences, if only in order to remind ourselves of some of the things we already know. We are not interested at this time in a review of the literature. The reader who so desires may make his own comparisons with other published reports.

It is desired to emphasize at the outset that this is a series of typically civilian and essentially nonindustrial injuries (there was only one industrial case). The male sex was represented by 144 patients, the female by 39, or approximately 79 percent of males. The incidence of cases in the various age groups showed that only 7 patients were past 60 years of age, and only 2 past 70, but revealed nothing else of any significance which would jus-

tify giving all the figures. No tabulation has been made on the basis of race or color, but we know that the proportion of Negroes (53.5 percent) was much larger than that in the population of the area served.

Out of the total of 185 eyes, 101 were lost, 42 by evisceration; the remaining 59 were enucleated (table 1). As shown in this table, a time element of seven days is introduced, during which early period af-

TABLE 1  
PENETRATING INJURIES

	A*	B†	Totals
Enucleations	20	39	59
Eviscerations	34	8	42
Number of eyes lost	54	47	101
Number of eyes saved			84
Total number of eyes in entire series			185

\* Within 7 days of injury.

† Later than 7 days after injury.

ter injury 34 of the 42 eviscerations were performed, but only 20 of the 59 enucleations. The statistics would only be complicated further by a breakdown into periods of one, two, or more days, and although the selection of the one-week period is arbitrary, the purpose will be evident. Naturally enough, most of the eviscerations were performed within one to three days of injury, and on hopelessly injured blind eyes, many with such large gaping scleral or corneoscleral wounds or ruptures that enucleation would have been difficult. Delay on the patient's part in giving consent, or delay in seeking medical care, were the reasons in the few cases in which evisceration was postponed more than a few days or a week; the

\* From The Department of Ophthalmology, Cook County Hospital, Chicago. Read before The Chicago Ophthalmological Society, March 19, 1945, as part of a symposium on eye injuries.

same considerations applied to enucleation in many cases. By those patients in whom the injury was hopeless and the eye blind or virtually so, enucleation or evisceration was finally refused when advised in six cases only. Conservative operations were performed on 25 eyes (table 3) which were later enucleated, this termination being almost invariably associated with undue prolongation of the primary inflammation. The other 34 enucleations were performed as the primary operation.

The location of the wound or rupture (table 2) was significant, especially in regard to the large number of purely scleral, and also of corneoscleral injuries, each group being approximately equal in number to that in which the wound was only corneal.

Conservative surgery on 87 eyes (table 3), or nearly half the total number in the series, was successful in saving 62 eyes, or well over two thirds of those operated upon. With exception of the three magnet operations, there were only six cases of this group in which a delay of more than two days occurred between injury and operation. The intervals were respectively 17, 12, 7, and 6 days, and in two cases were 4 days. All of these eyes were saved; two recovered 1.0 vision, one 0.4; the other three patients were small children aged 1, 2, and 3 years, respectively. In most cases, operation was performed within 24 hours of injury, and in some within only a few hours. Of the 25 eyes enucleated after the failure of conservative surgery, it is probable that at least 12, or almost 50 percent, should have been enucleated primarily. There were only two eyes of this group of 25 which retained any considerable prospect of useful vision for more than a week or two after injury and operation. Only one case of sympathetic ophthalmia occurred in this group, although in the entire series the

total was two. It is possible that in some of the other 24 cases, sympathetic ophthalmia was prevented, a point which cannot be fully covered at this time, inasmuch as full pathologic reports on some of these eyes are not yet available. There

TABLE 2  
LOCATION OF WOUND (OR RUPTURE)

Site	No. of Eyes
Corneal	61
Corneoscleral	63
Scleral	59
Not stated	2
Total	185

TABLE 3  
RESULTS OF CONSERVATIVE SURGERY

Procedure	Eyes Lost	Eyes Saved	Totals
Conjunctival flap	22	58	80
With iridectomy	11	32	43
Without iridectomy	11	26	37
Scleral suture	1	3	4
Magnet operations	2	1	3
Totals	25	62	87

A total of 22 eyes which did not require operation recovered, with varying grades of visual acuity.

is one case, which we have not designated as sympathetic ophthalmia, in which paraffin sections of a small calotte showed lesions suggestive of sympathetic ophthalmia, but no positive diagnosis can be made yet, as the eye is in celloidin and not ready for sectioning. This eye had a corneoscleral wound caused by broken glass, and a conjunctival flap was done on the same day as the injury. The primary inflammation never subsided completely, and, about seven weeks after injury, enucleation was performed. This patient's uninjured eye has normal vision, and has not shown any evidence of inflammation during the entire period since the injury, a fact which has been confirmed within the past month by slitlamp

TABLE 4  
TYPE OF INJURY OR WOUND IN RELATION  
TO RESULT

Type of Wounds	Corneal	Corneoscleral	Scleral	Totals
Incised or lacerated wounds (direct injury)				
Eyes lost	18	23	20	61
Eyes saved	33	21	18	72
Totals	51	44	38	133
Rupture (contusion or blunt force)				
Eyes lost	6	13	21	40
Eyes saved	4	3	5	12
Totals	10	16	26	52

examination, some seven months after enucleation of the injured eye.

There were three magnet cases, in all of which the eye or the vision was eventually lost. In one case, the eye was enucleated shortly after failure to remove the foreign body. In another, although the foreign body was successfully removed, all that was saved was a blind eye. In the third case, in which the patient was first seen six months after injury, at which time the lens was completely opaque, the foreign body was removed with some difficulty by the scleral route. The eye became quiet, and an extracapsular lens extraction was done about six months after the magnet operation. For several months thereafter, the eye retained a corrected vision of 0.5, but later there were recurrent attacks of uveitis, secondary glaucoma, with finally loss of the remaining vision, and enucleation was performed almost three years after the original injury. This patient's remaining eye is, fortunately, normal.

The relative destructiveness of injuries in relation to the location of the external wound or rupture, shown in tables 4, 4 A, and 4 B, is in accord with previous knowl-

edge. For example, almost two thirds of the eyes with incised or lacerated wounds of the cornea were saved, as against the loss of more than half of those with similar types of wounds which were scleral or corneoscleral. The far greater destructive effect of severe contusion, with rupture of the tunica fibrosa, is strikingly shown. Less than 25 percent of those eyes with scleral or corneoscleral ruptures were saved, and of these 8 eyes, 5 were blind, 2 had vision of only 10/200, and the other, with a small scleral rupture, had 0.3. The 10 eyes with corneal ruptures fared somewhat better, only 4, or 40 percent, surviving, and 3 of these retained surprisingly good vision; namely, 0.4, 0.8, and 1.0, respectively. In many of

TABLE 4 A  
TYPES OF INJURY IN EYES LOST

Type of Wound	Corneal	Corneoscleral	Scleral	Totals
Incised or lacerated wounds (direct injury)	18	23	20	61
Rupture (contusion or blunt force)	6	13	21	40
Totals	24	36	41	101

TABLE 4 B  
TYPES OF INJURY IN EYES SAVED

Type of Wound	Corneal	Corneoscleral	Scleral	Totals
Incised or lacerated wounds (direct injury)	33	21	18	72
Rupture (contusion or blunt force)	4	3	5	12
Totals	37	24	23	84



these cases of severe contusion, especially, as will be shown later, those inflicted by a blow of the bare fist, or a fall, there is considerable evidence that the eyeball is ruptured by a true crushing injury, in the sense in which the term is used by the general surgeon, as when a hand or foot is crushed in a power press or beneath the wheels of a heavy truck or car. In these cases, the bulb is compressed between the striking object and the medial wall of the orbit, or its roof or superior medial angle.

Of injuries produced by sharp objects (table 5), more than two thirds were caused by glass fragments and knives. It is noteworthy that out of a total of 42 eyes injured by broken glass, 11 sustained penetrating wounds due to lens fragments

TABLE 5  
NATURE OF OBJECT CAUSING INJURY

Number of Eyes	Sharp Objects
42	Glass fragments (including spectacle lenses)
11	Spectacle lens fragments
24	Knife blades
3 each	Dart, ice pick, wood splinter, wood chip, steel chip (intraocular), scissors
2 each	Fishhook, razor
1 each	Can opener, hairpin, thorn, pin, staple, steel nail, twig
Number of Eyes	Blunt Objects (Contusion)
8	Falls (2 in bathtubs)
23	Blow of fist
3 each	Blows (unspecified), blackjack, wooden stick
2 each	Arrow, baseball, coat hanger, door-knob, iron pipe, stone
1 each	Ashtray, baseball bat, brick, gun stock, hook, post, rake handle, ruler, steel rod, toy, umbrella rib, walking cane
Number of Eyes	Other Categories
6	Gun shot injuries (bullets or BB shot, 3 intraocular)
9	Automobile accidents
4	Explosions
4	Unknown (in two cases, alcoholic intoxication)

TABLE 6  
RESULTS IN CERTAIN TYPES OF INJURY

Type of Injury	Total No. of Eyes	Eyes Lost	Eyes Saved	Eyes Saved but Vision Lost	Eyes Saved with Some Vision
Glass	42	15	27	6	21
Blow of fist	23	20	3	2	1
Falls	8	7	1	1	0
Gunshot	6	5	1	0	1
Motor car	9	4	5	2	3

from the patient's own spectacles. Blows with the bare fist caused a greater number (23) of ruptures of the eyeball than any other single type of blunt force, with falls ranking second. The extremely destructive nature of these injuries (table 6) is shown by the loss of 27 out of 31 eyes in the two groups combined, and the further fact that only 1 of the 4 eyes saved retained any vision. That is to say, in almost 97 percent of these cases, there was loss of the eye or of the vision, or both. Even in the six gunshot injuries, the one eye saved had some vision, although only 15/200. On the other hand, vision of various grades was retained by half of the eyes injured by glass, although about one third of these eyes were lost, and about 20 percent of those saved were blind.

Injuries to the lens or the zonule occurred in 56 eyes. There were 49 cases of traumatic cataract in which the zonule was not ruptured. In 7 eyes the zonule was ruptured, with subluxation or dislocation of the lens, and in 5 of these cases the lens was cataractous. In 43 cases the lens was injured by direct (penetrating) force, whereas contusion was responsible in the other 13 cases, including 6 of those with rupture of the zonule. The number of eyes lost was 27, or almost 50 percent of the total of this group, which is a little lower than the overall percentage (55 per-

cent). Of the 27 eyes lost, 14, or practically half, were removed (or eviscerated) very promptly, because of the severity of the injury. Three cases of endophthalmitis with lens injuries were identified clinically. Two of these eyes were lost, and the other remained blind. There may have been a few other cases of mild endophthalmitis which were masked by the lens opacity, and some of these may have recovered, as sulfonamides were given to 28 patients in this group.

There were two cases of sympathetic ophthalmia in the entire series, or slightly over 1 percent. Duke-Elder states that an average from the literature is 2 percent (of penetrating injuries). In both of our cases the injury was caused by glass. One was a boy four years of age, with a large transcorneal corneoscleral wound, in which a conjunctival flap with iridectomy was done on the day of the injury. An error of judgment was involved in the failure to enucleate the injured eye primarily, and, failing this, at some time within three weeks after the injury. Actually, this eye was not enucleated until five weeks after the injury, and four days after the onset of the uveal inflammation in the second eye. At the present time, the vision of this eye is reduced to 5/200 by old exudates and a degenerative keratitis.

The other case was "imported," and hence not chargeable to the service, inasmuch as the patient, a young man of 21 years, did not present himself until 10 weeks after the injury, for which operations had been performed in the interim at another hospital. The injured eye was promptly enucleated on our service, but this was (also) already four days after the onset of uveitis in the second eye. This patient was much more fortunate, however, in regard to the fellow eye, and recovered a visual acuity of 1.0.

In the entire series of 185 eyes, the visual acuity demonstrated on admission was better than serving only to count fingers at 5 feet in only 23 eyes (table 7 A). It may be significant that only 1 of these 23 eyes was lost, and the acuity of that eye on admission was no better than 0.1. It will be noted, on the other hand, that of 76 eyes with no light perception on admission, only 4 were saved, and only 2 of these regained any vision. More than half of the eyes with bare light perception were saved, and about 70 percent of those with vision sufficient only to perceive hand movements, as shown in table 7 A. Of eyes with acuity of better than perception of hand movements on admission, only two were lost (5/200 and 20/200) except for two small children whose visual acuity could not be tested and one in which the acuity was not recorded. Regarding the fact that 94 percent of the eyes which had no light perception on admission were lost, there may be some who will claim that the very fact that light perception was lost was the reason for the decision to enucleate or eviscerate the injured eye. This is certainly not correct. The decision to sacrifice the eye (or what was left of it) was based primarily on the severity of the injury, and the objective condition of the eye. Absence of light perception was merely inherent in this situation in the great majority of cases; to be exact, in 72 eyes out of 89, which latter figure represents the number of eyes with injuries so severe as to be practically hopeless.

There were 50 patients whose vision was better than 5/200 in the injured eye after recovery, and 34 of these had better than 0.1 vision (table 7 B). In addition to these, there were two small children, not included in the table of visual results (visual acuity on admission unknown) who have been reexamined in the past seven weeks. One was injured on August

8, 1941, at the age of four years and has recovered 0.6 with Jaeger 1 in the injured eye. The other was injured on January 16, 1942, at the age of two years, and now has 1.0 vision in the injured eye.

Table 8 gives a few figures on the employment of the sulfonamides; sulfathiazol in most cases. Of the 42 eyes lost in patients given sulfonamides there were 30 which were so severely injured that they would have been lost anyway. Those who wrote the therapeutic orders would appear to have leaned over backward in these 30 cases to give the patient the benefit of the doubt, or to put it another way, perhaps in these instances the drugs were just wasted. However, we may tentatively conclude that the remaining 12 of these eyes were lost possibly despite the use of sulfonamides. The table also shows that in the cases in which sulfonamides were not given, the 59 eyes lost were so severely injured that their loss was inevitable. In the group of 95 cases in which sulfonamides were given, 53 eyes were saved. To what extent these drugs contributed, in many of these cases, to this happy result it is difficult or impossible to say. However (and the table does not show this), there were only 5 eyes of the 53 in which there was definite clinical evidence to indicate that loss of the eye was actually prevented by sulfonamide therapy.

Among questions which may arise as to the validity of some of the statistics presented, there are three of sufficient consequence to warrant discussion here. First, are there cases in which the vision of the injured eye, as demonstrated on admission, represents a substantial underestimate of the actual vision, due, let us say, to the patient's psychologic or general physical condition? It is probably true that there were a few such cases, but the evidence suggests that the number was small, probably much less than 5 percent

of the total. Of 53 eyes saved in which the initial demonstrated acuity was no better than for counting fingers at 5 feet, there were only 12 with sufficient acuity for counting fingers up to 5 feet, 16 with perception of hand movements only, 21 with light perception only, and 4 with no

TABLE 7 A  
VISUAL ACUITY ON ADMISSION

Acuity	Eyes Lost	Eyes Saved
Nil	72	4
Light perception	18	21
Hand movements	6	16
Counting fingers (1' to 5')	1	12
10/200	0	6
10/200 to 20/200	1	9
20/100 to 20/20	0	7
Under 5 years (no acuity test)	2	8
Unrecorded	1	1
Totals	101	84

light perception (table 7 A). Any cases in which the initial vision was underestimated are probably in this group. Of 98 eyes lost, in which the acuity on admission was recorded, only 2 were demonstrated to have any better vision than perception of hand movements. Only 18 had even light perception, and 72 had no light perception (table 7 A). These findings square quite well with the fact that the 72 eyes with no light perception were among the 89 so severely injured and obviously hopeless, that they were enucleated or eviscerated as soon as possible. It is not very likely that the acuity of these eyes was underestimated except possibly in a few cases as to the presence or absence of light perception. The same applies more or less to the 12 cases in which enucleation was done later, after an ill-advised primary conservative operation based on a false optimism had been performed.

The second question has to do with the eventual fate of the 84 eyes reported as saved. It is known that at the time of dis-

charge or subsequently (see below) 2 of these eyes were totally blind, 10 had only light perception, 7 only perception of hand movements, and 18 others no better than 0.1 (table 7 B). What is the present condition of these eyes, and what of their

in the past seven weeks of 44 of the 183 patients, in 22 of whom the injured eye was saved, while in the other 22 it was lost. Parenthetically, it may be remarked that of the 22 patients who lost the injured eye, 19 have normal vision in the

TABLE 7 B  
VISUAL ACUITY<sup>§</sup> AFTER RECOVERY

A*	B†	C‡	Visual Acuity Improved to											Unrecorded
			$\frac{10}{200}$	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.5	
Nil	4	2	1				1							
L. P.	21	10	5	1	1		1		1					2
H. M.	16	7	1		1	1	1		1	2				2
C. F. (to 5')	12	3	1		1	2		1	1	2	1			
10/200	6	2			2					2				
10/200 to 0.1	9	2		2				1			3	1		
0.2 to 1.0	7								1	1	4		1	
Totals	75	26	8	3	5	3	3	2	4	7	8	1	1	4

\* Visual acuity on admission.

† Number of cases.

‡ Number of cases (with less than 0.1) not improved.

§ Corrected vision.

future? Have any been enucleated without our knowledge?

The third question is simply an extension of the second, and has to do with the accuracy as of the present date and the future, of the acuities of the recovered eyes, as shown in table 7 B.

A partial answer to questions two and three is afforded by a reexamination with-

TABLE 8  
SULFONAMIDE THERAPY

	A*	B†	Totals
Eyes saved	53	31	84
Eyes lost	42	59	101
Eyes lost inevitably	30	59	89
Totals	95	90	185

\* Sulfonamides given (95 cases).

† Sulfonamides withheld (90 cases).

remaining eye, one has 0.6, and another, with bilateral injury, has only light perception in the remaining (injured) eye, but with some prospect of improvement to follow extraction of the cataractous lens. The other is the tragic case of sympathetic ophthalmia previously referred to, in which the acuity of the remaining eye is only 5/200. Of the 22 eyes which were saved, there is one blind eye which should be enucleated, but which has not yet been transferred to the lost column, as the enucleation has not yet been done. If this proportion holds good for the 76 per cent of saved eyes not reexamined very recently, there may be 4 eyes reported as saved which should be enucleated, making a total of 105 instead of 101 eyes lost, and 80 instead of 84 eyes saved.



In this recent reëxamination of 22 patients whose eyes were saved, there were in more than half the cases, some differences, in most cases slight, in the acuity of the injured eye as compared with that on discharge from the hospital. These changes were about equally divided between improvement and impairment. The acuities shown in table 7 B represent in each instance the most recent finding. Since traumatic cataract was present in 22 of the 84 eyes saved, there is the possibility that further improvement of vision may be secured in some of these eyes by operation.

#### SUMMARY AND CONCLUSIONS

To summarize only the most salient points brought out by these statistics:

1. Corneal, scleral, and corneoscleral injuries occurred in about equal proportions.
2. Of the incised or lacerated wounds, about two thirds of those purely corneal were saved; of the scleral and corneoscleral, less than half.
3. Of the corneal, scleral, and corneoscleral ruptures due to contusion, only 40 percent of the corneal were saved, and less than 20 percent of the others.
4. Injuries due to a fall or the blow of the bare fist were almost uniformly totally destructive of the vision and even of the eye.
5. Broken glass caused 22.7 percent of all the injuries in this series, and in 50 percent of these, the eye or the vision was completely lost. There was partial loss of vision in most of the remainder.
6. Seventy-one percent of the 87 eyes upon which conservative surgery was performed were saved. Although in 6 cases operation was delayed from 4 to 17 days, not one of these eyes was lost.
7. Only one eye with demonstrated acuity on admission of as good as 0.1 was lost. Of the other eyes lost, no better

acuity than perception of hand movements was demonstrated on admission in 99 percent; there was no light perception in about 75 percent. Of 76 eyes with no light perception on admission, only 4 were saved, and only 2 of these recovered any vision.

8. While the value of the sulfonamides in certain cases cannot be questioned, there were but few cases in this series in which their dramatic effect could be demonstrated.

From the statistics presented, we feel justified in drawing two practical conclusions, both of which are important and worthy of emphasis, although not new. The first has to do with prevention. According to our statistics, more than one fifth of penetrating injuries of the eye would be prevented, or at least minimized, by the elimination of glass, as we now know it, from our domestic economy. Let us hope that the time may be close at hand when glass in its present form will be universally displaced by transparent plastics and new forms of unbreakable glass.

The other conclusion applies to a smaller group of cases, and has to do with overoptimism or attempted conservatism in dealing with penetrating injuries of a severe type, particularly those in which the wound is corneoscleral. There were 12 such cases, or about 6 percent, in this series, in which, through mistaken judgment, conservative surgery was performed instead of prompt enucleation. In such cases as these, the beginner in ophthalmology may reduce the risk to the patient, even though several hours' postponement of operation be entailed, by calling a consultant with sound clinical judgment.

As a last word, it may be worthwhile to rephrase and repeat an old dictum, designed to prevent sympathetic ophthalmia, as well as various other lesser evils,

to the effect that, in the absence of any cogent reason to the contrary, any eye with a penetrating wound should be enucleated within three weeks after injury,

unless the posttraumatic inflammation has subsided or is well on its way to subsidence.

58 East Washington Street (2).

## RELATIONSHIP BETWEEN VISUAL ACUITY AND REFRACTIVE ERROR IN MYOPIA

FLIGHT LIEUTENANT J. S. CRAWFORD, FLYING OFFICER C. SHAGASS, AND  
FLIGHT LIEUTENANT T. J. PASHBY, MEDICAL BRANCH, R.C.A.F.  
*Toronto, Ontario*

### INTRODUCTION

The purpose of this paper is to present quantitative data showing the relationship between visual acuity and refractive error in the various types of myopia; namely, simple myopia, simple myopic astigmatism, and compound myopic astigmatism.

Visual acuity plays an important part in determining the medical fitness of a candidate for aircrew duties in the R.C.A.F. Since it is known that the results of a visual-acuity test may fluctuate considerably from day to day, it is often difficult to decide upon the acceptance or rejection of a candidate with visual acuity that borders on the minimum standard. On the other hand, clinical observation has led to the belief that refractive error determined under cycloplegia will remain fairly constant over a short period of time at least. It was considered, then, that auxiliary visual standards, stated in terms of refractive error, would permit more ac-

curate selection in cases with "borderline" visual acuity.

A review of the available literature revealed only one study (Kempf, Collins, and Jarman<sup>1</sup>) in which quantitative data for the relationship between visual acuity and refractive error in myopia were presented. Unfortunately, this investigation was carried out with children, of whom only 123 out of 1,860 were myopic, and the authors made no attempt to segregate the various types of myopia. The present study contains the results obtained by comparing the refractive errors and visual acuities of 909 R.C.A.F. personnel.

### METHODS

The data were obtained from an analysis of the refraction records accumulated at two R.C.A.F. medical boards. Most of the examinations had been carried out by four ophthalmologists.

*Subjects.* There were 909 subjects; 885 male and 24 female. The mean age

TABLE 1  
NUMBER OF SUBJECTS AND MYOPIC EYES AND MEAN AGE OF MYOPIA GROUPS

Myopia group	No. Subjects	No. Eyes (cases)	Mean Age
Simple myopia	266	325	24.4 years
Simple myopic astigmatism	138	160	24.7 years
Compound myopic astigmatism	505	714	23.6 years
Total	909	1199	23.9 years

of the group was 23.9 years, most of the subjects being between 18 and 32 years of age. Only 6.5 percent were 33 or older at the time of examination. For the purposes of this study, it was decided to consider every myopic eye examined as an

was observed. The findings used in this study were obtained *before* a cycloplegic was administered. The cycloplegic was a 5-percent solution of homatropine hydrobromide given as follows: two drops instilled at least 60 minutes before the start

TABLE 2  
SIMPLE MYOPIA  
RELATIONSHIP BETWEEN VISUAL ACUITY AND REFRACTIVE ERROR (SPHERES)

R.E. in Diopters	Visual-Acuity Fraction and International Rating										Total	Mean V.-A. Rating %
	20/20	20/30	20/40	20/50	20/60	20/70	20/80	20/100	20/200	20/400		
	100.0	66.7	50.0	40.0	33.3	28.6	25.0	20.0	10.0	5.0		
-.25	30	9									39	92.3
-.50	9	19									78	58.2
-.75	1	7	41	30	15	2	2				98	45.2
-1.00		1	3	18	12	2					36	38.7
-1.25			1	6	8	3	1		3		22	31.7
-1.50				1	2	2	1	5	4		15	21.9
-1.75					1	1	1		4		7	
-2.00							1		2		3	17.4
-2.25					1	1				2	4	
-2.50									1		1	
-2.75								2	4		6	10.0
-3.00										4	4	
-3.25										1	1	
-3.50										3	3	
-3.75											0	5.3
-4.00											5	
-4.25									1	2	3	
or more												
Total	40	36	76	69	44	11	6	7	19	17	325	47.2†
Mean R.E.	-.32	-.50	-.66	-.82	-.97	-1.30	-1.33	-1.87	-2.08	-3.58	-.972‡	

† Mean visual-acuity rating of the total group.

‡ Mean refractive error of the total group.

individual case. For this reason the number of "cases" presented in the text below exceeds the number of subjects. Table 1 shows the number of subjects, the number of myopic eyes, and the mean age of each myopia group.

**Procedures.** The visual acuity was determined by means of the Snellen test carried out with an American Optical Company Project-O-Chart in a 20-ft. dark tunnel. In the testing of visual acuity an attempt was made to eliminate the effect of squinting by raising the upper eyelid digitally whenever squinting

of the refraction, followed by one drop 15 minutes after the first instillation.

**Treatment of data.** For statistical purposes, the visual-acuity fraction was converted into a percentage (for example,  $20/30 = 66.7$  percent). This percentage represents the international visual-acuity rating. The rating does not correspond to the actual percentage of vision,<sup>2</sup> but mathematical calculations can be made more readily when visual acuity is expressed in these terms. Kempf, Collins, and Jarman<sup>1</sup> treated their visual-acuity results in a similar manner. The mean

TABLE 3  
SIMPLE MYOPIC ASTIGMATISM  
RELATIONSHIP BETWEEN VISUAL ACUITY AND REFRACTIVE ERROR (CYLINDERS)

R.E. in Diopters	Visual-Acuity Fraction and Rating								Total	Mean V.-A. Rating %
	20/20	20/30	20/40	20/50	20/60	20/70	20/80	20/100		
	100.0	66.7	50.0	40.0	33.3	28.6	25.0	20.0		
-.25	30	1		1					32	97.0
-.50	9	13	12	2	1				37	67.0
-.75	1	12	12	3	1				29	57.0
-1.00		3	13	3	5				24	47.4
-1.25	1	1	9	8	1	3			23	45.9
-1.50			2	1		2		1	6	37.8
-1.75				4					4	
-2.00			2					2	4	34.7
-2.25					1				1	
Total	41	30	50	22	9	5	0	3	160	62.4†
Mean R.E.	-.34	-.67	-.90	-1.14	-1.08	-1.35	—	-1.83	-.795‡	

TABLE 4  
COMPOUND MYOPIC ASTIGMATISM  
RELATIONSHIP BETWEEN VISUAL ACUITY AND LARGER CYLINDER

R.E. in Diopters	Visual-Acuity Fraction and Rating										Total	Mean V.-A. Rating %
	20/20	20/30	20/40	20/50	20/60	20/70	20/80	20/100	20/200	20/400		
	100.0	66.7	50.0	40.0	33.3	28.6	25.0	20.0	10.0	5.0—		
-.50	26	25	14	3							68	74.6
-.75	19	35	51	24	10	2					141	57.7
-1.00	3	24	63	34	31	3	1	2	1		162	46.4
-1.25	2	5	41	25	31	9	5	1			119	42.2
-1.50		4	10	18	17	8	1	6	7		71	35.2
-1.75		1	2	6	7	5	4	3	4		32	30.7
-2.00				2	4	3	3	3	5	1	21	18.6
-2.25						2	1	1	9	4	17	
-2.50						3		2	3	7	15	16.4
-2.75				2	3	1	2			4	12	
-3.00					2	1		1	1	9	14	13.8
-3.25					3				1	3	7	
-3.50						2	1	1	1	6	11	11.2
-3.75									1	1	2	
-4.00										6	6	5.5
-4.25 or more								1	1	14	16	
Total	50	94	181	114	108	39	18	21	34	55	714	43.9†
Mean R.E.	-.66	-.82	-.98	-1.16	-1.36	-1.72	-1.83	-2.00	-2.18	-3.42	-1.36‡	

† Mean visual-acuity rating of the total group.

‡ Mean refractive error of the total group.

visual-acuity ratings obtained by averaging the percentages may be converted into the conventional visual-acuity fractions with a numerator of 20. In compound

myopic astigmatism the larger cylinder was in all cases treated as the refractive error. Preliminary calculations showed that the larger and smaller cylinders tend



to vary together in size, so that little is gained by also considering the smaller

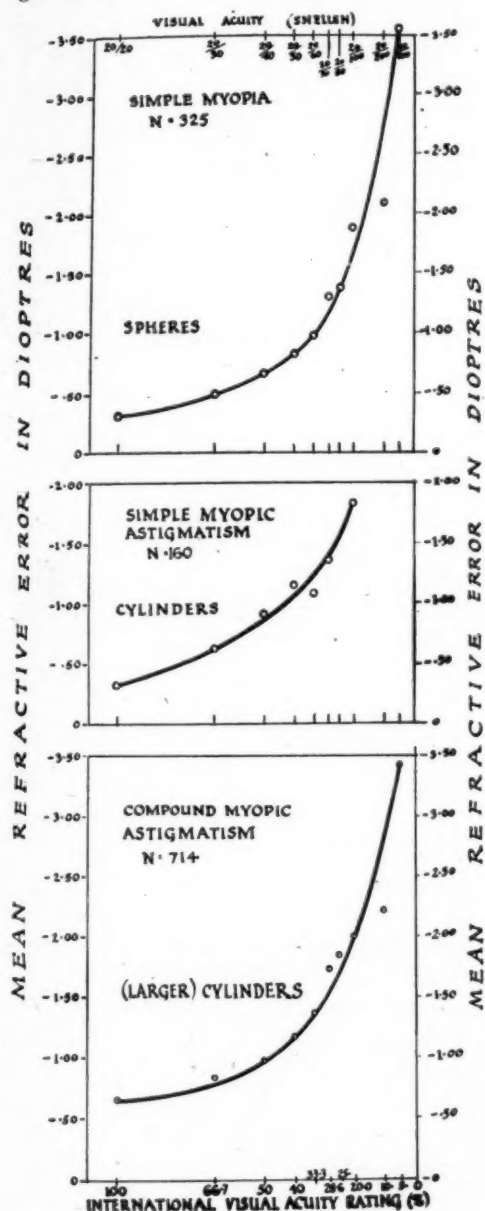


Fig. 1 (Crawford *et al.*). Mean visual acuities for specified diopters of different types of myopia. Individual graphs give type of myopia, type of corrective lens, and number of cases (N). Open circles represent actual mean international visual-acuity ratings. Smooth curves were fitted by inspection. Graphs derived from data in tables 2, 3, and 4.

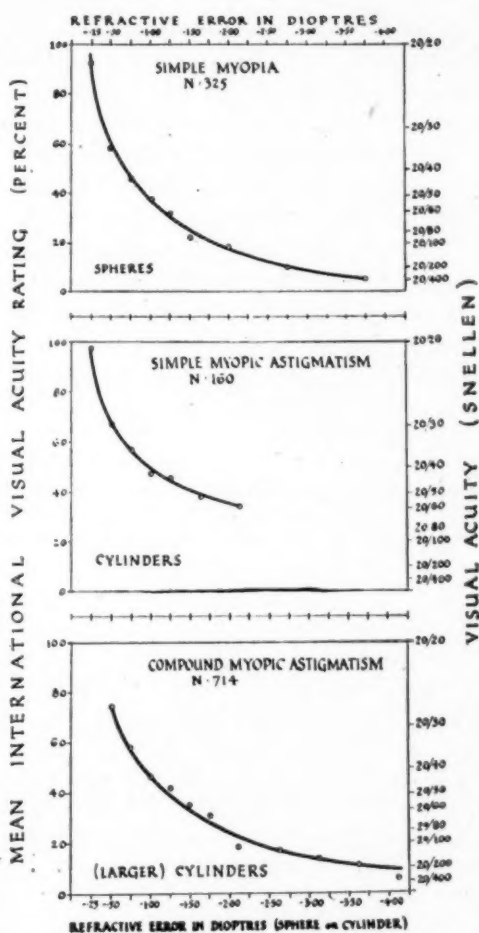


Fig. 2 (Crawford *et al.*). Mean diopters of different types of myopia for specified visual acuities. Individual graphs give type of myopia, type of corrective lens, and number of cases (N). Open circles represent actual mean refractive errors. Smooth curves were fitted by inspection. Graphs derived from data in tables 2, 3, and 4.

cylinder. (The linear correlation between the larger and smaller cylinders was .812.)

## RESULTS

The distributions of cases obtained by comparing visual acuity and refractive error in 325 cases of simple myopia, 160 cases of simple myopic astigmatism, and 714 cases of compound myopic astigmatism are given in tables 2, 3, and 4, re-

spectively. Also shown in these tables are the mean refractive errors corresponding to each visual acuity and the mean international visual-acuity ratings for those ranges of refractive error in which it was considered that there were sufficient numbers of cases to justify the calculation of a mean. The mean visual-acuity ratings for specified diopters of refractive error are graphed in figure 1, and the mean refractive errors corresponding to each visual acuity are plotted in figure 2 for each of the three types of myopia.

dex of .775 reported by Kempf, Collins, and Jarman<sup>1</sup> for all types of myopia in children.

The smooth curves in figures 1 and 2 were drawn by inspection. They closely approximate the actual means represented by the open circles and are a further indication that a lawful relationship exists between visual acuity and refractive error in myopia. It should be emphasized, however, that the curves in figures 1 and 2 serve only to describe the present data and do not necessarily portray the true

TABLE 5  
CORRELATION RATIOS (ETA) FOR RELATIONSHIP BETWEEN VISUAL ACUITY AND REFRACTIVE ERROR IN SIMPLE MYOPIA, SIMPLE MYOPIC ASTIGMATISM, AND COMPOUND MYOPIC ASTIGMATISM

Type of Myopia	Prediction of V.-A. from R.E.		Prediction of R.E. from V.-A.	
	Eta	Probable Error	Eta	Probable Error
Simple myopia	.834	.011	.888	.008
Simple myopic astigmatism	.792	.020	.705	.028
Compound myopic astigmatism	.764	.011	.829	.008

It is clear from the data that, in simple myopia, simple myopic astigmatism, and compound myopic astigmatism, an increase in refractive error is generally accompanied by a reduction in the visual acuity. An indication of the strength of association between visual acuity and refractive error in the different types of myopia may be obtained from the correlation ratios\* presented in table 5.

All of the correlation ratios show that these two variables are strongly correlated, with, perhaps, a stronger relationship in simple myopia than in the other types. The statistical constants obtained for the variation in visual-acuity rating with change in refractive error (.834, .792, .764) agree well with the correlation in-

mathematical relationship between visual acuity and refractive error in the different types of myopia. The shape of the curves is conditioned by the percentage method of expressing visual acuity, and the points involving visual acuities of 20/200 or worse are probably inaccurate because the ordinary Snellen test is very crudely graded above 20/100, with only one test letter for 20/200, 20/300, and 20/400 vision. Up to 20/100 vision, the data presented in figures 1 and 2 probably do give a close approximation to the true relationship between the international visual-acuity rating and refractive error in simple myopia, simple myopic astigmatism, and compound myopic astigmatism.

\* The correlation ratio, symbolized by the Greek letter, eta, is a statistical constant which indicates the strength of the connection between two variables and which is used when the relationship is curvilinear. (A correlation coefficient is used for a linear relationship.) The correlation ratio may vary from zero to 1.00. A ratio of 1.00 indicates a perfect association between two variables while a zero ratio indicates the absence of any relationship (Guilford,<sup>2</sup> pp. 343-349).

Tables 2, 3, and 4 show that for a given visual acuity there is usually to be found a relatively wide range of refractive errors and correspondingly for a given refractive error there will be a wide range of visual acuities. This result would, of course, have been anticipated from the observed day-to-day variation in visual-acuity measurements which gave rise to this study. Thus, although the average visual acuity in a series of individuals with a given refractive error in a specified type of myopia may probably be predicted with considerable accuracy from the present data, a similar prediction for any individual person cannot be made.

#### DISCUSSION

Quantitative data have been presented to show that there is a close relationship between visual acuity and refractive error in simple myopia, simple myopic astigmatism, and compound myopic astigmatism; generally the refractive error becomes greater as the vision becomes poorer. The association between these two variables is, however, not a perfect one, and it is not to be expected that accurate prediction of visual acuity from refractive error (or conversely) can be made for any single individual. It would appear that factors other than the refractive error influence the performance of myopic individuals in a Snellen test.

Although individual predictions cannot be made from the data in this study, the results may be used to determine the visual acuity which would be most likely

to correspond to a given refractive error in a series of cases. If the visual standards for a given type of employment required the attainment of a given Snellen reading, an auxiliary standard in terms of refractive error could also be stated. For example, if the visual-acuity standard were 20/50, it could also be stipulated that the refractive error should not exceed -1.00D. in simple myopia (see table 2 and upper section of figures).

#### SUMMARY AND CONCLUSIONS

1. Data showing the quantitative relationship between refractive error and visual acuity were presented for 325 eyes with simple myopia, 160 eyes with simple myopic astigmatism, and 714 eyes with compound myopic astigmatism.

2. The results showed that visual acuity and refractive error are closely correlated, although factors other than refractive error influence visual-acuity measurements.

3. The data presented here permit for myopia the construction, in terms of refractive error, of visual standards which may be used to supplement the usual statement of such standards in terms of Snellen test findings.

The writers wish to acknowledge their gratitude for the advice and criticism of Wing Commanders J.V.V. Nicholls and K. E. Evelyn, Squadron Leader J. F. Minnes, and Flight Lieutenant L. S. S. Kirschberg.

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## RESECTION OF THE INFERIOR OBLIQUE MUSCLE IN HYPOTROPIA\*

ORA HAROLD WAGMAN, M.D.

*Boston*

Resection of the inferior oblique at its insertion offers a practical and effective means of correcting hypotropia due to paresis or paralysis of this muscle. Only one report of this procedure appears in the literature.<sup>1</sup> To those familiar with the surgical anatomy of this area the operation may well be found readily acceptable. Poor surgery, however, may result in a haggled procedure, the functional end result of which may even be that of a tenotomy. This would simply further weaken an already parietic muscle and cause a more pronounced dropping of the eye. On the other hand, a clean, anatomic dissection and exposure of the various structures as they are encountered, coupled with a neat resection and securely anchored sutures, is a gratifying procedure which appears to give positive results and on the whole is not difficult of attainment.

### BACKGROUND IS RECENT

Shortening of the inferior oblique was first reported in 1935 by Wheeler<sup>2</sup> who approached the muscle through a skin incision over the orbital margin. The muscle was severed from its bony attachment, pulled over the orbital margin, and attached to the periosteum. Wheeler observed that his results had been "disappointing in some instances" but "rather easy of performance." White<sup>3,4</sup> suggested either advancement or tucking of the inferior oblique near its insertion through a conjunctival incision just below the external rectus, or a tuck made and advanced similarly to that described by Wheeler<sup>2</sup> for advancement of the supe-

rior oblique. However, White<sup>5</sup> found that when operative attack was confined to the paralytic inferior oblique alone negligible results were obtained.

Chavasse<sup>6</sup> was of the opinion that because the periosteum at the orbital margin was so thin there would be some difficulty in securely anchoring a resected muscle stump to it, as described by Wheeler. He suggested tunnelling of the lower orbital margin in the direction of the nasal cartilages, passing of the muscle through the tunnel, and then emerging through a second skin incision where the suture was tied over a piece of wool. Chavasse claimed that the amount of pull of the parietic oblique could be regulated in accordance with the requirements of the case at the time the suture was tied. No cases were reported. This procedure is largely an extraorbital one which, no doubt, few ophthalmic surgeons would care to undertake, as the probability of injury to the lacrimal apparatus is ever present and the danger of poor healing of two skin incisions very real. Furthermore, if the procedure of resection of the inferior oblique is to assume its rightful place in ophthalmic surgery it is highly desirable that the operative field be confined to the orbit.

The work of Hughes and Bogart<sup>7</sup> and of Hughes<sup>8</sup> on the correction of hypotropia by recession of the trochlea appears to be closely related to the problem at hand. These authors reported their experiences with recession of the trochlea in eight cases of overaction of the superior oblique muscle. The overaction was considered by them to be due to paresis or paralysis of the contralateral associate, the inferior rectus. However, they stated that in sev-

\* From the Ophthalmic Service of the Boston City Hospital and the Department of Ophthalmology, Tufts College Medical School.



eral of their cases the action of this muscle appeared in no wise deficient. In two cases it was definitely parietic. On the other hand, weakness of the inferior oblique, the direct antagonist, was noted in several instances. It seems reasonable to assume, therefore, that in some of their cases recession of the trochlea was performed for paresis of the inferior oblique muscle. Whether the paresis was primary or whether it was secondary to an overactive superior oblique cannot be stated categorically. Here again, the recession operation is a highly specialized one, involving several complications, including possible intracranial injury. Furthermore, it appears that simple resection of a parietic inferior oblique not only results in its strengthening but also in the elimination of overaction of the superior oblique.

Resection of the inferior oblique at its insertion was first performed by Berens and Loutfallah<sup>1</sup> in 1943, in a case of post-operative hypotropia wherein the same muscle, several years previously, had been tenotomized at its origin. An elevation in the hypotropic globe of 4 $\Delta$  in the primary position and 10 $\Delta$  in the field of action was obtained from a 7.0-mm. resection at its insertion. A single mattress suture of nylon was taken behind the previously applied muscle clamp and then carried into the episclera at the site of the original insertion. My procedure differs somewhat from the foregoing in that the clamped muscle was first severed from its insertion, the nature of which was thoroughly inspected, and a mattress suture of 4-0 chromic catgut on two atraumatic needles was taken first through the substance of the stump and then carried into the muscle, much as described by Lancaster<sup>9</sup> for resection of the horizontal recti. Because the insertion of the inferior oblique is rather wide, additional sutures were taken anterior and posterior to the central one, as illustrated in figure

3. This insured firm anchoring of the muscle to the sclera and lessened the likelihood of slipping. The external rectus was detached beforehand, a desirable routine in any event, inasmuch as a resection of this muscle was contemplated at the same sitting. It is obvious that this procedure differs little if at all from most present-day resection operations in which the sutures are buried and is therefore a strong argument for more of this type of surgery when it is indicated. A resection operation avoids the lumping effect frequently obtained with tucking of the muscle and appears to be a sounder surgical attack.

#### IMPORTANCE OF SURGERY FOR VERTICAL DEVIATIONS

It will be seen from the foregoing that resection of the inferior oblique muscle is not necessarily difficult. I have a similar attitude toward other types of surgery on the obliques and on the vertically acting recti; namely, the superior and inferior rectus muscles. The latter, of course, presents no unusual problems. This attitude has its basis in the fact that surgery of the vertical deviations has been sorely neglected and the need for it always has been great. I feel that the time is near at hand when the ophthalmic surgeon will not limit himself to standard procedures on the horizontal recti but will also look for and attack a coexisting vertical deviation if present. This indeed is very frequently the true underlying imbalance, the horizontal deviation actually being a secondary phenomenon.

Surgery of the vertically acting muscles must have its basis in a thorough "muscle work-up" and a correct diagnosis. The majority of horizontal deviations will be found to have a vertical component; most of these require surgery. If a vertical imbalance is recognized, surgery on the horizontal recti alone is not well

advised unless for some specific reason this is desirable. In general, a vertical deviation of more than 15 $\Delta$  is preferably attacked as a primary procedure or at least together with the surgery of the internal or external rectus or both, as the case may require.

Surgery of the vertically acting muscles has been increasing in significance from year to year, particularly so since orthoptics has gained in popularity. No less important is the fact that the ophthalmic surgeon's goal is increasingly that of a good functional result rather than a satisfactory cosmetic one. In the postwar era it is very likely that more attention will be paid to the preventive aspects of ophthalmology, and we may expect our patients to reach us long before suppression, amblyopia, and secondary correspondences have become well established. In this event restoring the binocular status will indeed demand more than just a routine operation on the internus or externus, or both.

The reader will gather that a paralytic factor underlies a vertical imbalance. Indeed, the majority of squints are due to a paralysis of one or more muscles, although the presence of an accommodative factor in many cases contributes to the horizontal deviation. Not commonly appreciated is the fact that paralytic squints of long standing frequently become concomitant, making a differential diagnosis difficult. The incidence of heterotropia due to a pure convergence excess or insufficiency, or divergence excess or insufficiency is indeed small. Since paralyses are the result of hereditary influences and disease or injury occurring in the prenatal, natal, or postnatal periods, our surgical problems will be largely found in young children. If a diagnosis can be made and surgery is indicated, no patient beyond the age of 18 months should be denied it. This fact is not recognized by

a large section of the medical profession in general.

#### PROPER WORK-UP OF EVERY SQUINT IS OF THE GREATEST IMPORTANCE

A muscle work-up to be adequate must include a careful inquiry into the onset and course of the squint, its relation to trauma, disease, and psychologic factors. The history of squint in siblings, parents, and grandparents is significant, as many have a familial etiology.

*General ocular examination.* Routine ocular examination is important and not infrequently passed over superficially. Diseases of the cornea, lens, vitreous, and the fundus, interfering with the formation of a proper retinal image as they do, are contributing factors in the production of squint. A rough appraisal of the ocular motility at this time is occasionally revealing, and a careful visual-acuity test with and without glasses is extremely important. The next step should include a refraction under full cycloplegia and the proper prescription for spectacles.

*Brief orthoptic investigation.* A brief diagnostic orthoptic work-up is of inestimable value, as may also be some preoperative orthoptic training. Generally, the determination of elementary fusional capacity by the Worth four-dot test is of importance. Further investigation should include the search for the presence and degree of suppression, secondary correspondences, measurement of the "subjective" and "objective" angles, all conveniently done on the synoptophore. The presence or absence of fusion at the angle of squint, if the vision is not too poor, may also be investigated on the synoptophore and is of value with respect to future capacity for fusional training.

The scrutiny of ocular motility and the measurement of the angle of squint are the highlights of the ocular investigation, and the most fascinating. These proce-

dures provide a background of clinical data, both gross and mathematical, by which one may be guided with respect to the kind and amount of surgery required, and without which one's attack becomes a hit-or-miss procedure and accounts for many failures.

*Screen comitance test.* Ocular motility is best investigated by the screen comitance test, as described by White,<sup>10</sup> one eye then the other being used in the fixation process. In this manner both primary and secondary deviations may be elicited and evaluated.

*Near point of convergence.* The measurement of the convergence near point in millimeters (PCB or NPC) is an extremely important guide to the amount and type of surgery indicated on the horizontal recti. The contributing effect on the convergence of the vertically acting recti and the obliques, when surgery on these is contemplated, must also be considered. A careful notation should be made of the distance in millimeters at which convergence is disrupted and of the eye that deviates first.

*Measurement with prisms.* The actual measurement of the angle of squint is best performed with square prisms and the screen test. The fixating eye is ascertained and the prisms are best placed before the squinting or less-dominant eye, as in the alternating type of squint. Measurements are made for distance (20 feet) and for near (13 inches), first with correcting spectacles, then without. One then proceeds to measure the angle of squint without correction in the six diagnostic positions of gaze.

*Hirschberg test.* If the amblyopic eye is unable to fixate a source of light, the Hirschberg test gives one an approximate measurement of the angle of squint in the primary position. In this test the patient is asked to fixate an object at infinity while a small source of light is held be-

fore the eyes at 13 inches; the position of the reflex on the cornea of the tropic eye is compared with that on the fixating eye and each millimeter of displacement from the center of the apparent pupil is noted. A displacement of 1.0 mm. is approximately equal to  $7^\circ$  of arc or  $14^\Delta$ . The test is repeated with fixation of the light at 13 inches. The test may be repeated with glasses and the existence of an accommodative factor evaluated.

Having gained both a mathematical and dynamic appraisal of the problem before him, and having arrived at a diagnosis, the ophthalmic surgeon is prepared to carry out the necessary procedures on a logical basis.

#### REPORT OF A CASE

This case illustrates the effectiveness of resection of a paralytic inferior oblique muscle in a patient with double elevator paresis of the left eye. It is one in which the paralysis was so marked that elevation of the globe to the median horizontal plane in the nasal field was not possible. It is also one in which a high degree of secondary contracture of the ipsilateral superior oblique was present. There was moderate weakness of the superior rectus in the same eye, with the result that there was limitation of elevation of the globe in abduction as well.

M. M., a girl, now aged seven years, was first seen in the Ophthalmic Clinic of the Boston City Hospital in November, 1940. The complaint presented by the mother at that time was turning in of the left eye following a seizure of whooping cough one year previously. The child was recorded as having an "in and downward" turn of the left eye. The refraction was estimated under atropine cycloplegia and +1.50D. spheres were prescribed. A diagnosis of paralysis of the inferior oblique and superior rectus muscles of the left eye was made, but surgery was not contem-

plated. A year later, at age  $3\frac{1}{2}$  years, it was noted by another examiner that there was "difficulty" in elevation in adduction and "weakness" in elevation in abduction, that the right eye was the fixating eye, and that the angle of squint was 35 to 45 arc degrees. The following year a surgical approach to the problem was considered,

seizure of whooping cough about one year later it remained permanently esotropic. The mother denied more than periodic esotropia before that time.

Inquiry into the prenatal, natal, and postnatal periods was unrevealing. Except for a moderately severe attack of pertussis at the age of  $1\frac{1}{2}$  years, the pa-



Fig. 1 (Wagman). The patient eight months prior to surgery. Right eye fixating. Left esotropia pronounced. Left hypotropia is particularly striking in that line of fixation of right eye is directed slightly upward. Note head tilt to right.

but no definite steps were taken. Several refractions were done under cycloplegia, and the prescription varied somewhat each time, the latest one being: O.D. +2.50D. sph.  $\approx$  +0.50D. cyl. ax.  $90^\circ$ ; O.S. +2.50D. sph.  $\approx$  +0.75D. cyl. ax.  $90^\circ$ . Occlusion of the right eye was practiced from time to time.

I first saw this patient in August, 1944. Careful inquiry into the history revealed that the left eye "began" to turn in at the age of nine months and that after the



Fig. 2 (Wagman). The patient two months after surgery of the left eye. Internus receded 4.5 mm., inferior oblique resected 6.0 mm., and externus resected 10.0 mm. in one-stage operation. Horizontal alignment faultless. A left hypertropia of  $3^\Delta$  present in the primary position at 13 inches. Head tilt markedly improved.

tient experienced no further significant systemic diseases.

*Ocular examination.* The lids were entirely normal except, perhaps, for a suggestive ptosis of the left eye, which appeared to be no more than one would expect in a hypotropic eye, which, of course, is followed to some extent by its upper lid. This is properly a pseudoptosis. There was a moderate asymmetrical epicanthus, more marked on the left, im-



parting the appearance of even greater esotropia. The head tilt to the right was pronounced, and the face was usually turned noticeably downward. The globes were anatomically normal, the corneas clear, the pupillary dynamics active, the media and fundal expanses in no wise remarkable.

**Muscle balance** Gross inspection revealed that fixation was with the right eye and that the left eye was markedly esotropic and obviously hypotropic (fig. 1). The cover test disclosed little effort on the part of the left eye to take up and hold fixation. Inasmuch as paralyses and secondary contractures were so well established and the deviations so great, measurement with prisms and the screen test was deemed impractical and reliance was placed on the screen comitance and the Hirschberg tests. With the right eye fixating, the screen comitance test revealed marked limitation of elevation in the field of the left inferior oblique, and on depression, marked contracture of the left superior oblique. In eyes left and up, the left eye fixating, limited elevation was observed in the field of the left superior rectus, with a patent overshoot of the right inferior oblique, its contralateral associate. In eyes left, there was marked deficiency of abduction of the left eye, with secondary deviation of the right internus. In eyes right, secondary contracture of the left internus was very evident in that the cornea of the left eye practically disappeared behind the inner canthus. The Hirschberg test disclosed over 60° of esotropia and 15 to 25° of hypotropia, for both distance and near. With spectacles there was suggestive lessening of the horizontal deviation, indicating the presence of an accommodative factor. The findings of the screen comitance test preoperatively are set forth in figure 4, the number of plus marks indicating the de-

gree of deviation, in as much as measurement with prisms was impractical, as previously stated.

**Visual acuity and fusion.** The corrected vision was: O.D. 20/20 + 2, O.S. 20/50-1. Suppression was marked in that no diplopia could be elicited under any circumstances. Absence of first-grade binocular single vision was demonstrated with the Worth four-dot test. The projection was faulty.

**Preoperative approach and rationale.** After four periods of three weeks each of continuous occlusion of the right eye, no demonstrable improvement in vision was obtained and no change in the character of the squint was observed.

With the noted measurements as a guide it was decided that operative attack would include a 4.5-mm. recession of the internus, a 10.0-mm. resection of the externus, and 6.0-mm. resection of the inferior oblique, all of the left eye. The exact amount of surgery to be performed on each muscle was to be determined from the findings at operation. The postoperative increased secondary abducting action of a resected inferior oblique was not overlooked with respect to its effect on the horizontal deviation. The inferior oblique being a short muscle, a larger resection was deemed impractical and imprudent; if necessary, it was felt that further elevation could be obtained at a later date by resection of the ipsilateral superior rectus.

**Operative technique.** The operative procedure will not be described in great detail as I do not consider it particularly unusual, for it differs little from other surgery of the extraocular muscles.

Under general anesthesia the left eye was prepared in the customary manner, the lashes trimmed, the eye irrigated, antiseptic instilled, and a speculum inserted. A vertical incision in the con-

junctiva, 8.0 mm. long, was made with the Stevens scissors just temporal to the semilunar fold, and Tenon's capsule was entered below the internus. The latter was isolated, freed, and recessed 4.5 mm., chromic catgut on two atraumatic needles being used. The conjunctiva was closed

traction and identifying suture and also to insure against irretrievable loss of the muscle within the orbit. The muscle was next severed from its insertion, its under-surface freed from the globe and from the underlying inferior oblique. It was allowed to retract into the orbit with its

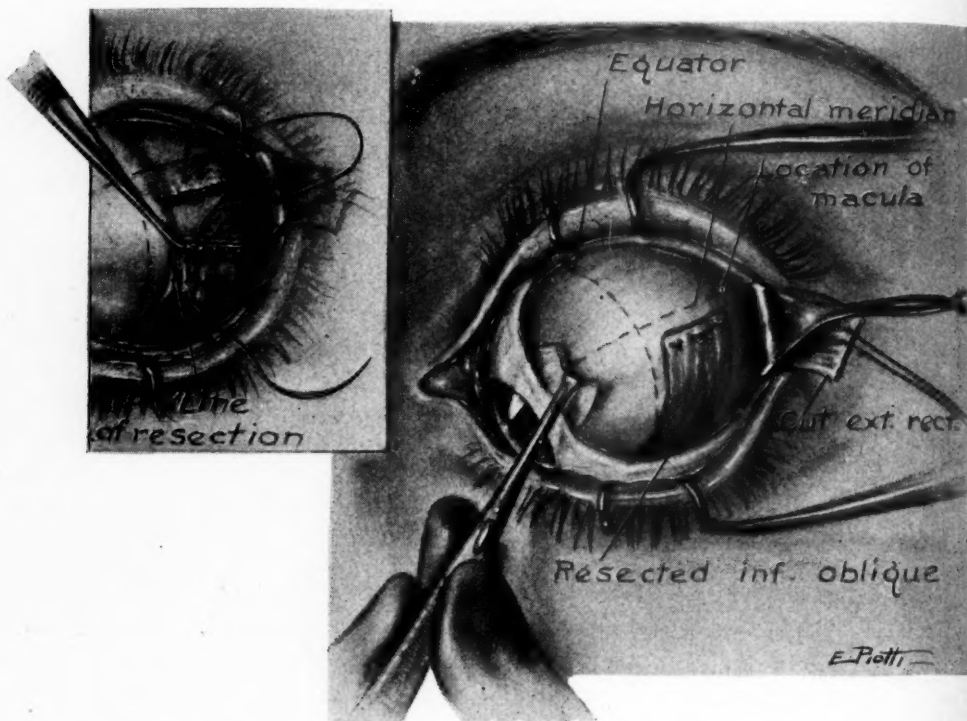


Fig. 3 (Wagman). Drawing illustrates resected inferior oblique and method of exposing operative field. Stump of external rectus is grasped with a von Graefe fixation forceps and globe rotated nasally; a Desmarres retractor is employed to retract temporal structures. Inset shows manner of taking sutures.

with a continuous suture of 4-0 black braided silk.

The globe was then rotated nasally and a vertical conjunctival incision made over the insertion of the external rectus, extending from its upper border to a point 4.0 mm. below its lower border. Tenon's capsule was entered and the externus identified and isolated. A black-silk suture was passed through the muscle near its insertion, tied, and left long to serve as a

attached black-silk suture. The stump was grasped with a von Graefe fixation forceps, and the globe adducted fully. The assistant, standing to my left and facing me, was instructed to hold the globe in the adducted position with his left hand; a medium-sized Desmarres lid retractor was slipped under the temporal border of the incised conjunctiva, including the retracted rectus muscle, and the assistant directed to hold it with the

thumb and index finger of his right hand, palm up (fig. 3). In this manner the inferior oblique muscle was widely exposed and clearly visible through its enveloping Tenon's capsule. A Prince resection forceps was then applied 2.0 mm. from its insertion and the muscle divided. One double-armed 4-0 chromic catgut mattress suture was taken in the center of the scleral stump, then into the belly of the muscle, and the muscle resected 6.0 mm. in the manner described by Lancaster<sup>9</sup> for resection of the horizontal recti (fig. 3, inset). This was followed by similar sutures, one taken anterior to it, the other posterior. These additional sutures insured permanency of the reattachment.

A 10.0-mm classical Lancaster resection on the external rectus, employing chromic catgut material, was then carried out and the conjunctiva closed as before.

The character and development of the muscles operated on were as anticipated: the internus was hypertrophic, the externus moderately thin, and the oblique a broad and delicate structure.

At the conclusion of the operation I noted that there was slight over correction in the vertical meridian, a desirable end result. The horizontal correction appeared satisfactory.

*Operative dangers.* The important structures are in direct relationship with the most posterior, nasal aspect of the inferior oblique.

1. The macula lies about 3.0 mm. nasally and superiorly to the most posterior aspect of the insertion (fig. 3). Accordingly, extraordinary care must be exercised in dividing the muscle here and particularly in taking the sutures as described.

2. The long posterior ciliary nerve bears a similar relationship and its severance would lead to disturbances in pupillary size.

3. The optic nerve lies 5.0 mm. nasally to the posterior border of the muscle. However, injury to or severance of the nerve with a Stevens scissors is indeed a remote possibility.

4. The belly of the inferior rectus runs just superior to the inferior oblique and one must use precaution in dissection lest the former be accidentally divided.

#### POSTOPERATIVE STATUS

Scrutiny of figure 2 will impress the reader with the very satisfactory cosmetic result obtained. Moreover, measurement with prisms and the screen test at 20 feet revealed a remarkably small deviation in the primary position; namely, an exotropia of 6<sup>Δ</sup> and a left hypertropia of 3<sup>Δ</sup>. At 13 inches no measurable horizontal deviation could be elicited; as anticipated, the vertical deviation was unchanged in character and amount. These figures are significant in that they indicate the very favorable postoperative alignment for orthoptic training to develop binocularity. It will be noted that, in the primary position, a *hypotropia* of some 15<sup>Δ</sup> or more was converted into a *hypertropia* of 3<sup>Δ</sup> by resection of the inferior oblique muscle.

Study of the ductions (monocular excursions) revealed improved action of the inferior oblique in that the globe could be elevated above the median horizontal plane in adduction, but it was still markedly deficient. Also the overaction of its direct antagonist, the secondarily contracted superior oblique, was completely eliminated, indeed so thoroughly that the left hypertropia increased moderately with eyes right and down.

A mathematical evaluation of the versions (associated movements, rotations) in the six cardinal fields is set forth in figure 5. On the horizontal meridian with

eyes right there was observed to be a small exotropia and a left hypertropia, the result of postoperative paresis of the left internus and shortening of the left inferior oblique. With eyes left, a small esotropia and right hypertropia were present, indicating mild deficiency of the left external rectus and left superior rectus muscles. In eyes right and up the marked right hypertropia persisted due

that the 4.5-mm. recession of the internus was not excessive.

*Postoperative refraction.* Under atropine cycloplegia the following correction was ordered from the retinoscopy. It represented 1 diopter of plus sphere less in each eye than the full cycloplegic acceptance: O.D. +3.50D. gave vision of 20/15-1; O.S. +3.00D. sph.  $\approx$  +0.75D. cyl. ax. 90° gave vision of 20/50-1.

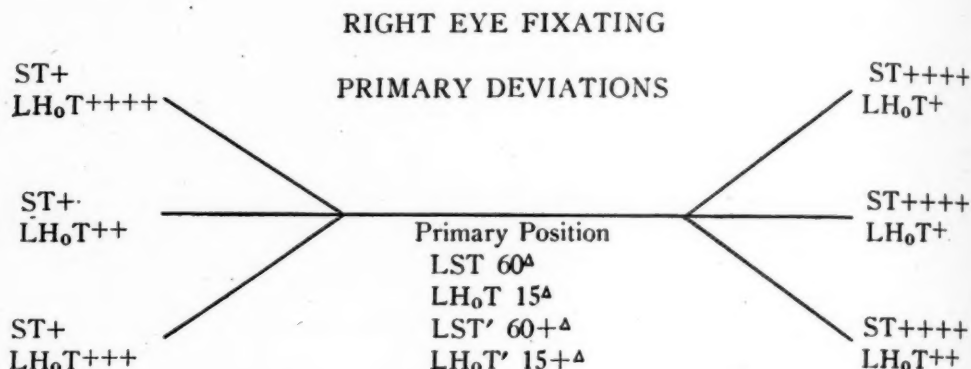


Fig. 4 (Wagman). Preoperative findings. Screen comitance test. Each + sign indicates approximately 15<sup>A</sup> of deviation. Hypotropia present in all fields, most pronounced in field of action of left inferior oblique muscle. Note marked deviation in right lower field due to contracture of left superior oblique. ST = esotropia; XT = exotropia; HT = hypertropia; H<sub>0</sub>T = hypotropia; R = right; L = left; (') indicates measurements at 13 inches.

to residual weakness of the left inferior oblique. In eyes left and up, a small right hypertropia was similarly elicited; this, however, was the result of a congenitally weak left superior rectus. A left hypertropia with eyes right and down was the result of a now restricted left superior oblique, the effect of shortening of the left inferior oblique. A small left hypertropia in eyes left and down indicated minor inadequacy of the left inferior rectus, very likely the result of the marked supporting effect of the shortened inferior oblique.

The near point of convergence measured 80.0 mm., with the left eye deviating outward at that point. This suggested

After the patient had worn the correction for one week the left eye became exotropic in the following amount: at 20 feet, 16<sup>A</sup>; at 13 inches, 20<sup>A</sup>. The correction was promptly reduced by 3 diopters of plus sphere in each eye, the final correction given being; O.D. +0.50D. sphere for vision of 20/15-1; O.S. +0.75D. cyl. ax. 90° for vision of 20/50-1. As a result of this change the measurements in the primary position remained as in figure 5. It proved the presence of an accommodative factor in this case by an amount varying from 16<sup>A</sup> to 20<sup>A</sup>.

*Orthoptic program.* At the time of this writing the patient had faulty projection and no fusion. The right eye will



be totally occluded for three-week periods. Exercises to correct the anomalous correspondence are being carried out three times weekly, after which binocular training will be instituted. When binocularity in the primary position is established the patient will be considered as having attained a cure, in the limited sense, of course.

with vertical components invariably so. It is pointed out that old paralytic squints commonly approach concomitancy and that the underlying paralysis is frequently overlooked.

An outline for a minimum preoperative study of ocular motility and binocular correlation is presented.

A case of double elevator paresis (su-

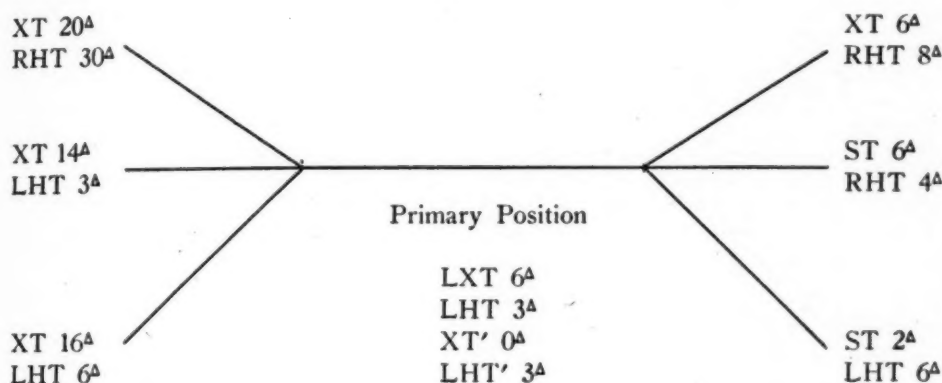


Fig. 5 (Wagman). Postoperative findings. Measurements with prisms and screen test. Note favorable measurements in primary position, particularly at 13 inches. Likewise noteworthy is the elimination of overaction of left superior oblique in its field of action, eyes right and down.

#### SUMMARY AND CONCLUSIONS

The operation of resection of a paralytic inferior oblique muscle is presented as a practical and effective procedure in selected cases of hypotropia and overaction, spasm or contracture of the superior oblique. Only one report of this operation appears in the literature.<sup>1</sup>

The recognition and need for the surgical correction of the vertical deviations is stressed. Most heterotropias are considered to be of paralytic origin, those

perior rectus and inferior oblique) of the left eye with overaction of the ipsilateral superior oblique is reported. A 6.0-mm. resection of the inferior oblique muscle was performed in conjunction with a recession and resection operation on the internal and external rectus, respectively. A *hypotropia* of more than 15<sup>A</sup> was converted into a *hypertropia* of 3<sup>A</sup>. Likewise a satisfactory horizontal alignment was obtained.

395 Commonwealth Avenue.

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### UNUSUAL TYPE OF CORNEAL OPACITIES

JOHN W. HENDERSON, CAPT. (MC), A.U.S., AND  
DELMAR R. GILLESPIE, CAPT. (MC), A.U.S.

During the seven-months' period, March through September, 1944, eight cases presenting an unusual type of corneal opacity were seen by us,\* occurring in soldiers in New Guinea. These eight cases are reported because they present this unusual type of corneal opacity which is of unknown etiology, and because an eye from one of the patients was studied histologically.

#### CASE REPORTS

CASE 1. A Pfc., aged 24 years, came to the eye clinic for the first time on March 13, 1944. This soldier stated that during the three days preceding his coming to the clinic he had noted "blurred vision" in both eyes. Since the onset of his visual difficulty he had been bothered by "glare" when working outdoors.

This soldier considered himself in good health. He had been overseas for approximately six months and had taken 0.1 gm. of atabrine daily during this time. He had not been ill during the overseas period and could not recall any change in his usual dietary regime.

\* Capt. Lloyd H. Mattice (MC), A.U.S., and Capt. B. K. Williamson (MC), A.U.S., each contributed a case record to this study.

*Ophthalmologic examination* revealed a visual acuity of 20/50 in the right eye and 20/40 in the left eye, with correcting lenses. During the testing of the visual acuity, the patient shaded his eyes with his hands in an attempt to decrease the diffusion of light in the examining room. The eyelids and conjunctivas were normal in appearance. Circumcorneal injection was absent. Irides were normal in color. The pupillary reactions were active. Ophthalmoscopically, the anterior segments of the eyes appeared hazy. In addition, a very fine, brownish stippling was visible. This stippling seemed to be located on the posterior surfaces of the corneas or anterior surfaces of the lenses. Several small spokelike opacities were visible in the periphery of the lenses, and through the haze the fundi appeared normal. The changes observed were present in both eyes to about the same degree of intensity.

A tentative diagnosis of hydrops and opacities of the lenses and corneas was made. The patient was hospitalized. A complete physical examination gave normal results. Routine blood counts and urinalysis were normal. Blood calcium, phosphorus, and blood-sugar determinations were within normal limits. During

hospitalization, the patient received the usual dietary routine and 0.1 gm. atabrine daily. Two days later, on March 15, 1944 (five days after onset), the patient noticed the disappearance of "glare" and he felt that his vision had returned to normal. Reexamination of the eyes revealed a visual acuity of 20/30 with each eye and by a slight alteration in the lens prescription the acuity was further improved to 20/20. Ophthalmoscopically the spokelike opacities in the lenses and the hazy appearances of the anterior segments had disappeared. Normal fundi were confirmed. However, the fine stippling noted upon the original examination was still present and appeared unaltered in both amount and distribution. A slitlamp was not available, so the location of the stippling could not be definitely determined. The patient was dismissed from the hospital, and since he belonged to a local unit he was asked to return for monthly checkups. The patient was told to resume his usual work, habits, and diet.

The soldier returned to the eye clinic during the months of April, May, June, and July, 1944. On all visits the visual acuity was found to be 20/20 with each eye and the stippling remained unaltered. On August 6, 1944, his last visit, visual acuity was 20/20 with each eye, but the fine stippling had disappeared. The eyes appeared normal when examined with the binocular loupe and ophthalmoscope.

CASE 2. A private, aged 21 years came to the eye clinic on May 4, 1944, complaining of having had blurred vision throughout the preceding week. The onset of the visual difficulty had occurred within a 24-hour period, and, to the patient's knowledge, it had remained unchanged during a six-day period. The patient could not associate the onset of the visual difficulty with any physical illness. He had been overseas for seven

months and had not been ill during that time.

*Ophthalmologic examination* revealed a visual acuity of 20/70 with each eye. Examination of the corneas, conjunctivas, lenses, and irides with the binocular loupe revealed no abnormalities. Ophthalmoscopically, a very fine, brownish stippling with bandlike configurations was visible. These opacities seemed to be located in the posterior corneas or on the anterior surfaces of the lenses as determined by parallax phenomena. The fundi appeared normal through the haze of the anterior segment.

The patient was hospitalized and a complete physical examination made. Routine blood counts, urinalysis, and blood sugar and blood calcium determinations were found to be within normal limits. No systemic cause for the ocular condition was found. The patient remained in the hospital for one week on the usual hospital diet and had the suppressive dose of 0.1 gm. atabrine daily. He was ambulatory throughout his hospital stay and felt that he was in good health.

Upon discharge from the hospital the visual acuity was 20/20, bilaterally. The haze in the anterior portions of the eyes had subsided, but the fine brownish opacities could still be seen with the ophthalmoscope. The configuration and number of opacities seemed unchanged from the original examination. A cause for the fine opacities in the eyes was not found. The patient was not seen again.

CASE 3. A private, aged 25 years, was admitted to the hospital on May 23, 1944, with the complaint of "blurred vision." The onset of the visual difficulty had been rather sudden; that is, within the preceding 12 hours.

On the day prior to admission to this hospital, the patient had been discharged from a hospital in the local area where he

had been hospitalized for eight days because of malarial fever. *Plasmodia vivax* had been demonstrated in a smear of the blood, and the patient had received the usual malaria therapy; namely: atabrine 0.4 gm. thrice the first day, 0.3 gm. thrice the second day, and 0.2 gm. twice daily for the next four days, and thereafter, 0.1 gm. daily as the suppressive dose.

*Physical examination* at this hospital was essentially negative except for the ophthalmologic findings. The patient had a moderate yellow discoloration of the skin from deposition of atabrine. According to the patient, there had been a slight weight loss of five pounds over the past few weeks. Repeated examinations of blood smears for malaria parasites were negative. The patient had been stationed in New Guinea for six months prior to his first hospitalization. He contended that during the whole of the time he had been stationed in New Guinea he had followed the suppressive regime of 0.1 gm. atabrine daily. The fever for which he had been hospitalized during the preceding week was to his knowledge, his first attack of malaria. There was nothing in his past history to indicate any previous difficulties with his eyes.

*Ophthalmologic examination* revealed a visual acuity of 20/100 with each eye. Gross examination of the external portion of the eyes revealed no abnormalities except for a glassy or polished appearance of the corneas. With the binocular loupe, a faint haze could be observed in the anterior segment of the eyes, but the haze could not be accurately located in either the corneas, aqueous, or lenses. The irides were of normal texture and color. With the ophthalmoscope, a fine, brownish stippling could be discerned amidst the haze in the anterior segments of the eyes. The fundi were not seen distinctly but gross pathologic change in the interior of the eye did not seem to be present. A

tentative diagnosis of edema and opacities in the posterior corneas or lenses, or both, was made.

Ophthalmoscopic examination was repeated three times in the two-week period following admission to this hospital. The appearance of the eyes, as studied with the ophthalmoscope and binocular loupe throughout the two-week period, was essentially unchanged from that observed at the original examination. However, the visual acuity decreased to 20/200 with each eye on the fourth day after admission and remained at this level thereafter.

The patient was placed on the usual hospital regime and received no therapy except the usual suppression atabrine, 0.1 gm. daily. On the seventh day after admission, the ward officer noticed the appearance of jaundice. The patient complained of moderate anorexia and nausea. A diagnosis of acute infectious hepatitis was made. The patient was placed on a high-vitamin, high-carbohydrate, high-protein, low-fat diet with 2 mg. of thiamine thrice daily as supplementary therapy. By the eleventh day of hospitalization he had become progressively worse. The jaundice had increased in intensity, and the patient complained of generalized abdominal pain and diarrhea. The oral intake of thiamine was discontinued, and the patient was given 25 mg. of thiamine intramuscularly twice daily, intravenous glucose and blood transfusions. On the thirteenth day, fresh blood was found in the stools and the tissues began to bleed at the sites of intravenous injections. On June 4, 1944 (14 days after admission), the patient vomited blood, the pulse became progressively thready, and he died.

An autopsy was performed and a pathologic diagnosis of acute yellow atrophy of the liver was made. The eyeballs were obtained at autopsy. Sections were made of one eye and several of the



sections were available to us for study. The remaining sections were forwarded to the Army Medical Museum.

The sections in our possession were sent elsewhere for microscopic study. We quote from Dr. Parkhill's\* report: "I find a localized pigmentation of the basal layers of the corneal epithelium in the region of the limbus on one side of the eye. There are minute pigment particles scattered along the posterior endothelial layer of the cornea and a few enmeshed in the pectinate ligament. There is also an area of increased pigmentation of the anterior layers of the iris on the same side as that which showed the pigmentation of the corneal epithelium. The pigment on the iris is mostly intracellular. These pigment granules both intracellular and extracellular are all fairly fine and most likely melanin, although in this case, I believe, it would require an iron stain to rule out the possibility of their being blood pigment. I did not find any pigment in or on the anterior lens capsule. There are numerous small vacuoles in the cortex just under the anterior lens capsule, but these are most likely artifacts."

CASE 4. A T/4, aged 28 years, came to the eye clinic on July 20, 1944. He stated that two days previously he had noticed sudden onset of blurred vision with each eye. He described the visual complaint as "looking through a dirty window pane." The patient could recall no previous ocular difficulties and considered himself in good health. He had been in New Guinea for a period of four months, and did not believe that there had been any departure from the usual dietary fare of his unit. Suppressive atabrine medication of 0.1 gm. daily had been followed by the patient.

\*Histologic examination was made by Dr. E. M. Parkhill, Section on Pathology, Mayo Clinic, Rochester, Minnesota.

*Ophthalmologic examination* revealed a visual acuity of 20/40 with each eye. Examination of the external portions of the eyes with ordinary illumination and with the binocular loupe revealed no abnormalities. With the ophthalmoscope, fine dustlike particles were seen in the anterior segments of the eyes and seemed to be located in the posterior portions of the corneas. In addition, a very slight, diffuse haze was noticeable, but this haze did not prevent a thorough study of the fundi, which were normal in appearance.

Complete *general physical examination* was carried out and was found to be essentially normal. Routine blood counts and urinalysis were within limits of normal. There was a slight, yellowish tinge to the skin that was considered the result of routine suppressive atabrine ingestion. An explanation for the objective findings in the eyes was not found.

On July 22, 1944, four days after onset of blurred vision, ophthalmologic examination was repeated. Visual acuity, uncorrected, was 20/20 with each eye. The slight haze in the anterior segments of the eyes as seen with the ophthalmoscope had disappeared. However, the fine dustlike particles were still evident and had not changed in their configuration or distribution. The fundi were again normal. The patient was returned to duty and was not seen again.

CASE 5. A Pfc, aged 27 years, came to the eye clinic on August 4, 1944. This soldier wished to have his glasses checked.

*Ophthalmologic examination.* The visual acuity, uncorrected, was 20/50 right eye, 20/40 left eye. With the glasses he was wearing (R.E. +0.50D. sph.  $\approx$  +0.50D. cyl. ax. 175°; L.E. +0.75D. sph.  $\approx$  +0.25D. cyl. ax. 25°) the visual acuity was 20/20 bilaterally. Inspection of the corneas, eyelids, conjunctivas, irides, and pupils revealed no abnormali-

ties. Ocular rotations were complete, convergence adequate, and the near point of accommodation was within normal limits. Upon ophthalmoscopic examination, a fine, brownish, diffuse stippling was visible and seemed to be located in the posterior portions of the corneas. The stippling was of equal distribution in the two eyes. These fine opacities did not interfere with the examination of the interior of the eyes. The hazy appearance of the anterior segments noted in other cases was not present in this patient's eyes. Fundi were normal.

The patient was questioned relative to previous difficulties with his eyes. He revealed that in March, 1944, five months previous to admission to the clinic, he had had a diminution of vision. He described the disturbance of vision as "blurring as though I were looking through a dirty window pane." He stated that both eyes had been affected. Further interrogation revealed a gradual onset over a one- to two-day period and a duration of two to three weeks with ultimate return of vision to normal. He had not consulted a medical officer during this episode of blurred vision.

The patient had been overseas approximately 12 months and considered himself in average health. He had experienced several bouts of diarrhea and had contracted one upper-respiratory infection during his overseas service. He contended that he had taken the usual suppressive atabrine of 0.1 gm. daily. A slight, yellowish tinge was evident upon examination of the skin. A general physical examination was essentially normal. The patient was returned to duty and we did not have an opportunity to reexamine him.

CASE 6. A Pfc., aged 24 years, was evacuated from a forward area to a nearby hospital for refraction. We had

the opportunity to study this patient in conjunction with the medical officer to whom the patient was assigned.

He was seen for the first time on August 30, 1944, and stated that for approximately 30 days prior to admission, the vision of each eye had been blurred. He felt that his vision had become progressively more blurred.

The patient had been overseas for approximately nine months. There was no antecedent history of visual difficulties. He had considered himself to be in good health. The medical officer in charge could not find evidence of systemic disease that might explain or contribute to the visual complaint. Suppressives atabrine, 0.1 gm. daily, had been taken by the patient since he had been overseas.

Visual acuity was 20/30 with the right eye, 20/200 with the left eye. The conjunctivas were normal in appearance. Congestion of the circumcorneal blood vessels was not present. The irides were equal in color and texture. With the binocular loupe, two small, gray infiltrates were seen in the deeper portions of the substantia propria of the left cornea. These infiltrates had fuzzy outlines. The cornea of the right eye appeared normal when examined with the binocular loupe. With the ophthalmoscope, a fine, brownish stippling could be seen in both eyes and seemed to be located in the posterior portions of the corneas. The number of brownish deposits were approximately equal in the two eyes, and these deposits were arranged somewhat in the shape of a broad band that extended horizontally across the corneas. Although a very slight haze seemed to be present in the anterior segment of the right eye, the fundus was easily seen and appeared normal. The details of the fundus of the left eye were obscured by a definite haze in the anterior portion of the eye. A tentative diagnosis of opacities in the posterior portions

of both corneas with edema of the left cornea was made.

The patient was confined to the hospital for observation. The usual hospital diet was supplemented by the administration of one multi-vitamin capsule thrice daily, and 2 mg. of thiamine thrice daily. One week later visual acuity had improved to 20/20 with the right eye; 20/30 with the left eye. The number and distribution of the fine opacities in the two eyes, as seen with the ophthalmoscope, were unchanged with respect to the original examination. The two small gray infiltrates in the substantia propria of the left cornea had decreased in size and intensity and were barely discernible with the loupe. A definite diffuse haze was still present in the interior of the left eye but an accurate study of the fundus was possible and found to be normal.

Ten days after admission to the hospital, visual acuity was 20/20 with each eye. The haziness had subsided and the infiltrates in the cornea of the left eye had disappeared. The fine stippling in the corneas was unaltered. The patient felt that he had recovered his usual vision.

The thiamine and multi-vitamin supplements to the diet were discontinued on the twelfth day. General physical examination was again essentially normal. The patient had felt in good health during his hospital sojourn. He was sent to duty two weeks after admission, and has not been available for reexamination.

**CASE 7.** A Pfc., aged 26 years, was evacuated from a forward area to a nearby hospital on September 15, 1944. History of his illness, as related by the patient, was as follows: During the middle portion of the month of August, the patient began to experience periods of vomiting. These episodes were usually brief and occurred shortly after mealtime. Vomiting occurred daily and no

therapy was prescribed by the unit dispensary. On September 1, 1944, the patient was hospitalized for malaria. He continued to vomit throughout the first three days of hospitalization. The malaria was treated with atabrine. Three days following the completion of malaria therapy, on September 9, 1944, the patient noted onset of blurred vision in both eyes. Except for a five-day period during the hospitalization for malaria in which he received atabrine in therapeutic doses, he had taken the usual recommended suppressive amount of 0.1 gm. daily. He had been overseas 17 months.

The medical records of his previous hospitalization were studied; they revealed a positive blood smear report for *Plasmodia vivax* on September 3, 1944. Malarial parasites were not found on subsequent smears of the blood. The patient was given atabrine 0.4 gm. three times the first day, 0.3 gm. three times the second day, 0.2 gm. twice daily for the succeeding four days, and 0.1 gm. daily thereafter.

*Ophthalmologic examination* was performed at this hospital on September 16, 1944. Visual acuity was 20/70 with each eye. The eyelids and conjunctivas were normal in appearance. Tiny, circumscribed droplets of clear fluid throughout the posterior layers of the corneas were easily visible with the binocular loupe. The irides were equal in color and seemed to be of normal texture. The anterior surfaces of the lenses could not be adequately studied because of the haziness of the corneas. With the ophthalmoscope, fine, discrete brownish-black deposits were visible, and these deposits seemed to be diffusely intermingled with the haze in the posterior portions of the corneas. The fundi could not be seen. A diagnosis of bilateral edema of the cornea with pigment deposition was made.

The patient had a sallow appearance.

According to the patient, there had been some loss of weight in recent weeks. The skin and mucous membranes were closely inspected. No abnormalities of these tissues could be found, except for a moderate pale-yellow discoloration that is so often seen in patients taking atabrine. Other than the findings already noted, general physical examination was essentially negative. The spleen was not palpable. Routine urinalysis and blood counts were within the limits of normal. Malarial parasites were not found on a thick blood smear.

The patient was placed on a regular dietary regime supplemented with the intake of eggs and carrots. He consumed several cans of dehydrated carrots for several successive days but soon lost his appetite for this food. Throughout the period of hospitalization, he was able to consume two eggs three times a day.

On September 19, 1944, four days after admission, examination of the eyes was repeated. Visual acuity had improved to 20/50 bilaterally. The edema of the corneas seemed to be less intense as studied with the binocular loupe. The fine stippling, as seen with the ophthalmoscope, was unchanged from the previous examination. The fundi were now faintly visible and appeared normal. On September 21, 1944, the edema of the corneas had almost disappeared. The fine, brownish deposits were much fewer in number but had not altered in location. Normal fundi were confirmed. Visual acuity was 20/40 bilaterally.

On October 2, 1944, 18 days after admission, visual acuity was 20/20 bilaterally. The corneas were clear. No evidence of a previous edema could be found. The fine stippling had also disappeared and the eyes appeared normal throughout. The patient felt that he had recovered full vision. He was discharged to duty soon after the last examination

of the eyes and has not been available for reexamination.

CASE 8. A Major, aged 34 years, a medical officer, consulted one of us on June 25, 1944. He requested a complete examination of his eyes because he feared that he was suffering from glaucoma. The patient related that within the preceding month he had noted haloes around electric lights. The halo phenomenon was particularly noted at night when the patient was facing the headlights of an approaching vehicle. He had no other complaints referable to the eyes and considered himself to be in average health. This complaint referable to the eyes was a rather unusual one. He gave the impression of stability; he seemed satisfied with his work, and there were no other bizarre complaints. Psychoneurotic tendencies did not seem to exist. He had been overseas approximately nine months.

*General physical examination* was negative.

*Ophthalmologic examination.* As complete an examination as possible was made of the eyes. Visual acuity was 20/30 bilaterally. The conjunctivas were clear throughout. The corneas were studied with the binocular loupe and seemed normal. The irides were normal in color. The aqueous appeared clear. Pupils were equal and the pupillary reactions to direct light and convergence were normal. With the ophthalmoscope, the media appeared clear, and the fundi normal. Perimetric visual fields were normal. The intraocular pressure seemed to be within normal limits as tested by palpation. An adequate explanation for the visual difficulties did not seem to exist. A diagnosis of glaucoma could not be supported.

The patient was informed of the negative results of the ophthalmologic examination but it was suggested that he go to a general hospital and have a series of



tonometric determinations of the intra-ocular pressure.

At the time of this patient's visit, we had already observed the first three cases reported in this series. The thought occurred to us that this patient's ocular difficulty might represent an incipient stage of the disease described in the first three cases. He was urged to supplement his diet with whatever multi-vitamin tablets were available, and, if possible, to return for reexamination.

Two weeks later the patient returned to this area. He reported that the visual phenomena of haloes had disappeared. Tonometric measurements of the intra-ocular pressure had been performed twice daily over the two-week period and always found to be within the limits of normal. The patient had ingested from 4 to 6 multi-vitamin tablets daily. Ophthalmologic examination was repeated and, the results were found to be the same as on the previous occasion except that visual acuity had improved to 20/20 in each eye.

In retrospect, this case was thought to represent an incipient phase of the disease described in this report. The subjective complaint could be explained on the basis of a corneal edema that was too mild to be detected by the instruments available.

#### DISCUSSION

The cases reported in this paper seem to have certain common ocular manifestations that warrant their study as a group. With the exception of case 8, a certain type of brownish opacity was observed in the anterior segments of the eyes. All of the individuals experienced a diminution of the visual acuity. The visual difficulty was always bilateral and in most instances the two eyes were affected equally. In two cases (3 and 7), the diminution of the visual acuity followed an attack of malaria. In all others

an antecedent history of systemic disease could not be found. Complete recovery of the visual function in a relatively short period of time was noted in all cases with the exception of case 3. In the latter instance, a study of the progress of the ocular condition was interrupted by the death of the individual.

A detailed description as to the location of the abnormalities noted in the eyes of these individuals was obviously hampered by the nonavailability of a slitlamp. With the instruments available, we could only surmise the location of the changes observed. However, we were fortunate in obtaining a microscopic section of an affected eye, which gave us some clue as to the nature of the disease process and confirmed in some degree our opinions as to the site of the disease.

The finding of fine, pigment particles scattered along the posterior endothelial layer of the cornea in the pathologic specimen confirmed the speculation that the brownish opacities were located in the posterior layers of the cornea. However, these opacities did not produce the blurring of the vision, since they were so frequently noted following complete recovery of the visual acuity. The brownish particles were part of the disease process and remained as residuals when the disease had subsided. In cases 1 and 7, it was found that the opacities ultimately disappeared.

The haze noted in the anterior portions of these patients' eyes was the factor responsible for the lowered visual acuity, for the vision improved as the haze became less dense. The pathologic specimen did not aid in locating the position or in explaining the nature of this haze. Vacuoles in the lens substance were noted, but these were thought to be artifacts. The lens epithelium seemed normal. The contents of the anterior chamber were lost in the preparation of the microscopic sec-

tion. In case 1, a transient, spokelike opacity was noted in the lens substance. This raised the possibility that an edema of the lens substance was responsible for the haze. In two cases (3 and 7) definite edema in the substances of the cornea was visible.

The absence of pain and photophobia, the lack of circumcorneal or conjunctival injection, the normal appearance of the irides and pupils ruled out local diseases of the eye such as iritis, conjunctivitis, scleritis, and keratitis. The fundi in all cases were normal. There were insufficient signs to support a diagnosis of glaucoma. This lack of the usual signs of local ocular disease caused us to seek an etiologic explanation through systematic examination.

All cases were examined for evidence of systemic disease as well as for avitaminosis. General examination was essentially normal in all cases with the exception of the eye findings. In case 3 an infectious hepatitis developed after the patient's admission and he died. All of the patients had considered their health to be good. No signs of vitamin deficiency could be ascertained. Blood counts and blood-chemistry studies were within normal limits. Malaria smears were negative at this hospital.

It was felt that the cause of the haze and the corneal opacities was a result of a systemic disturbance which was not

demonstrable with the facilities available to us.

#### SUMMARY

1. Eight cases are reported presenting similar disturbances of visual acuity.

2. The patients in each of these cases experienced a diminution of visual acuity proportionate to the density of a haze noted in the anterior portion of the eyes. Visual acuity returned to normal in a short time except in the case of the patient who died.

3. In seven of these cases, fine, brownish, dustlike opacities were observed in the anterior segments of the eyes. The patient in case 8, who complained of peculiar haloes, was thought to represent an incipient phase of the disease described.

4. Microscopic sections of the eye of one of these patients, who subsequently died of hepatitis, showed the brownish opacities to be "... minute pigment particles scattered along the posterior endothelial layer of the corneas. . . ."

5. No evidence of systemic disease or avitaminosis could be found to account for the disease process.

6. The cause of the ocular condition as described warrants further study.

*247th General Hospital,  
APO 713, Unit 1,  
c/o Postmaster, San Francisco, California.*

## NEW PERMANENT HAND MAGNET IN THE LIGHT OF PRESENT-DAY MAGNET-OPERATION METHODS\*

B. S. BRODSKY, M.D.

Odessa, U.S.S.R.

In practical ophthalmology various types of electromagnets (hand and giant) are now in general use for the removal of iron and steel splinters from the eye. In most cases the removal of the splinters is effected by the application of these magnets. However, the use of electromagnets entails certain inconveniences: first of all, the large size and considerable weight of the magnet, the crowding of the operative field when the magnet is brought up to the eye, the need of a special room (provided with alternating current and transformer) for the operation, the high cost of the magnet, and other factors.

Many clinicians prefer to use giant magnets, but there are quite a number who use the hand magnet exclusively. The clinic of Academician W. W. Filatow (Odessa) and many other clinics as well are of the view that possession of a giant magnet does not exclude the need of hand magnets. Both types of magnet are required for the correct application of magnetic aid. Both magnets have their special fields of application.

Considering the inconvenience of working with giant magnets, and acknowledging the value of hand magnets, Prof. S. F. Kalfa<sup>1</sup> (Odessa) and I<sup>2</sup> proposed in 1939 the use of permanent magnets in the practice of ophthalmology. Although the latter have been known for a long time, they did not find practical use because of their low magnetic power and because they soon became demagnetized under various external influences.

\* Because of transportation difficulties, the author's proof of this paper has not been available for corrections.

The removal of splinters, apparently from the ocular surface, with the aid of a magnet stone was first reported by the Strassburg physician Brunswig (according to Feldhaus,<sup>3</sup> 1903) in a publication issued first in 1497, then in 1498 and 1534. In the 1534 edition the author says, "When iron gets in somebody's eye he should open the eye and a magnet stone will pull off the splinter." The originator of this method is unknown.

Fabricius Hildanus (according to Hirschberg,<sup>4</sup> 1882) in 1656 used natural magnets for the removal of splinters from the cornea. About 100 years later (1745) a publication describes the removal of iron splinters from the iris by the aid of a permanent magnet (according to Snell,<sup>5</sup> 1880) and in the year 1779 such a procedure appears in an article by Morgani (cited by Hirschberg, 1882). The latter tried, though without success, to remove a splinter by means of a magnet in a case of corneal ulcer. He nevertheless recommended this method in such cases.

A steel splinter from the sclera was first removed with a permanent magnet by Meyer (cited by Himly, 1843), who accomplished this operation in 1842. Himly (1842) pointed out the possibility of removing splinters from the anterior chamber by means of a magnet.

Dixon in 1858 and W. Cooper in 1859 (both cited by Wagenmann,<sup>6</sup> 1921) used the magnet for the purpose of drawing a foreign body from the interior of the eye to the wound. McKeown<sup>7</sup> (1874) was the first to penetrate into the vitreous with a permanent magnet for the removal of iron splinters.

In the Russian literature the applica-

tion of a permanent horseshoe-shaped magnet for the removal of splinters from the cornea was first mentioned in the reports of Pergamin<sup>8</sup> (1882).

Magnets of that and even of a later time (McKeown,<sup>9</sup> 1874, 1878; Snell,<sup>10</sup> 1881) proved to be imperfect. Thus Snell in his publication says: "It is difficult to get a magnetic stone having sufficient power at its ends, when they are small, which could practically serve for the detection and removal of steel and iron." This was the circumstance which led ophthalmologists of that time to look for more reliable apparatus, which then proved to be the hand electromagnet (Hirschberg,<sup>11</sup> 1876; McHardy,<sup>12</sup> 1878; Krukow,<sup>13</sup> 1884 and others). The introduction of electromagnets in the practice of ophthalmology of that time was a big step ahead. To this day electromagnets are the most valuable apparatus in our operating rooms.

At present, however, there is the possibility of returning to the use of permanent magnets. The old-time permanent magnets, made of ordinary sorts of steel, did not possess great ultimate induction (Br)—a high degree of magnetization—and at the same time great coercitive power (Hc); that is, the power to preserve its magnetic state against the action of an external demagnetizing field. The materials now used for permanent magnets (iron, nickel, and aluminum alloy, the alloy "alnico") possess higher magnetic properties, surpassing those of many of the known magnetic steels. The alloy was patented toward the end of 1932 by Mischima and named M.K. by its originator (according to Meskin,<sup>14</sup> 1937). The composition was reported by Mischima within large limits (Ni—10-49 percent, Al—1-20 percent, C—0.5 percent, Fe—the rest). At present this alloy has been adopted by various countries. Similar to this alloy but of still greater

power is the alloy "alnico" (aluminum, nickel, cobalt, iron).

A table of magnetic characteristics of the most important sorts of magnetic steel (according to data found in the literature) follows:

Name of Steel	Ultimate induction (in gauss) Br	Coercitive power (in ersteds) Hc
Carbon steel, hardened at 850°-0.84% C	7,600	52
Wolfram steel	10,600	65
Chrome steel	9,000	70
Cobalt steel	9,000	200
English Cobalt—chrome steel 15% Co	9,500	170
Iron-nickel—aluminum alloy	7,500	450
Alnico	10,000	650

Iron-nickel-aluminum alloy in its mechanical properties presents a very hard and brittle material which endures no mechanical treatment except polishing. The superiority of this alloy, in addition to its magnetic properties, lies in the fact that it requires no thermal treatment except of tempering in the interval 450 to 700°C. Preparation of permanent magnets from this alloy consists only in obtaining the cast. Therefore the production is inexpensive. Magnets of iron-nickel-aluminum alloy will have to supplant all other permanent magnets. Its great superiority consists in the fact that the shape and scale of the magnet can be taken as approaching to an infinitely small magnet in order to obtain equal magnetic power. In order to magnetize magnets of nickel-aluminum steel a very strong magnetic field, of the order of 10,000 ersteds, is required because of the great coercitive power. For small magnets this task is solved quite simply by placing the magnet between the poles of a strong electromagnet. Magnets of this alloy are stable to usual temperature increase and mechanical vibration (Rose,<sup>15</sup> Meskin).



We began to study the application of permanent magnets in the practice of ophthalmology in 1938. The first removal of a foreign body with the permanent magnet was accomplished in the Odessa Eye Clinic by Academician W. P. Filatow on the 27th of April, 1939.

The patient, R-ka, a girl, aged 11 years, during play on March 6, 1939, received a blow to her right eye. She came to the eye clinic on April 26, 1939, complaining of reduced vision. Examination showed a slight pericorneal injection. A small grayish scar was found on the cornea at the superior exterior quadrant in the direction of the 10-o'clock position. The iris was of a greenish color. At about the 10-o'clock position on the pupillary border a foreign body about 2 by 1 mm. in size was seen to be entangled in the iris. The pupil reacted normally to light. Visual acuity was 0.35-0.4. The magnetic test by the Volkmann magnet gave positive results. The magnetic test carried out after this with our permanent magnet was also positive. On April 27, 1939, the magnet operation was performed. After akinesia, epibulbar and retrobulbar anesthesia, an incision was made of the bulbar conjunctiva and the sclera in the superior exterior direction. Then the final incision of the cornea was made. The foreign body was easily removed by holding the permanent magnet against the wound. The weight of the foreign body was 0.004 gm. The next day the eye was quiet, the chamber restored, the pupil large but of irregular form. On April 29th the eye was quiet, the eyeground clearly visible. The patient left the Clinic and was transferred to ambulatory treatment.

The first model of the magnet was pearshaped. It was 11 cm. in length and 335 gr. in weight, and was made of iron-nickel-aluminum alloy of approximately the following composition (Al-11-14 percent, Ni-20-25 percent, Cu-3-5

percent, Fe-56-66 percent). The final induction of the given pattern was 5,000 to 6,000 gauss. Its coercitive power amounted to 500 to 550 ersted. The measure of the attractive power of the magnet showed that it was even a little greater than that of the Hirschberg manual electromagnet. The magnet attracts a small iron ball of 0.7 gm. on a horizontal plane at a distance of 11 mm.; the Hirschberg magnet at a distance of 10 mm. The force needed to remove a ball 1 gram in weight from our magnet is 183.5 gm., for the Hirschberg magnet it is 68.9 gm.

Until the outbreak of the present war we accomplished more than 65 operations successfully by the aid of this magnet. We removed splinters from both the anterior and the posterior areas of the eye. The removal of splinters from the posterior part of the eye was accomplished diasclerally.

The second model of our magnet was prepared from the alloy "alnico" of the following composition: Al-13 percent, Ni-20 percent, Co.-7-9 percent, Fe-the rest). The ultimate induction of this magnet amounts to 7,000 gauss, and the coercitive power to 400 to 500 ersted. The magnet consists of a cylindrical body 108 mm. in length and 210 gm. in weight, with one end pointed like that of a pencil. In both cases interchangeable caps of soft iron "Armko" go with the magnets; one straight and the other with an angle, both of which are slipped upon the plain end of the magnet (fig. 1).

The measure of the attractive power for two accidentally taken iron splinters gave the following results. One of the splinters of irregular shape, about 4 by 1 mm., in size and 12 mg. in weight, begins to vibrate on holding the magnet at a distance of 35 mm. and is attracted upward from a distance of 21 mm. The second iron splinter of irregular shape, about 7 by 3 mm. in size and 40 mg. in

weight begins to vibrate on holding the magnet at a distance of 38 mm. and is attracted vertically from a distance of 23 mm.

From experience with our magnet we were convinced that it is most effective in cases of iron splinters in the cornea or

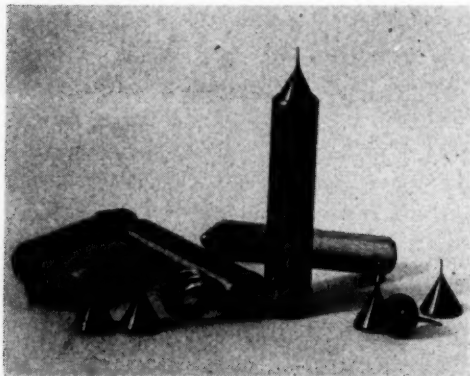


Fig. 1 (Brodsky). The second model of the magnet, showing assembled view and the magnet taken apart (core of the alloy "alnico," case, nut, and tips).

the anterior chamber, the iris, the lens after corneal incision (anterior route). However, its diascleral application (for splinters in the posterior segment) can be accomplished only on the basis of exact X-ray data obtained by aid of the method of Komberg-Baltin and others.

Regarding the question of incision of the sclera for the removal of splinters from the posterior portion, I<sup>16</sup> proposed some modification. Formerly, after incising and separating the conjunctiva, we accomplished the incision of the sclera in meridional direction through all the coats of the eye. We found that various kinds of splinters can be removed by scleral incision, without much injury to the integrity of the choroid and retina, which is important for the preservation of ocular function. This point of view is shared by quite a number of authors (Haab, Genet, 1914; Pichler, 1918; Vogt, 1926; Elschning, 1928, cited by Warschaw-

sky<sup>17</sup>), who recommended avoiding wherever possible the opening of the choroid and retina. For isolated trephining of the sclera we employed the cylindroconical trephine FM-II to FM-III (Filatow-Marcinkowsky) with piston or hermetical barrier inside the tube, such as has been used by Filatow previously for the transplantation of cornea and for many other operations on the sclera<sup>18</sup> (fig. 2). We also take care, by suitable pressure of the trephine on the one side, not to excise wholly the scleral disc, but to leave it in contact with the sclera in one place. We thus get something like a small window.

The steps of our latest diascleral method of removing splinters are the fol-

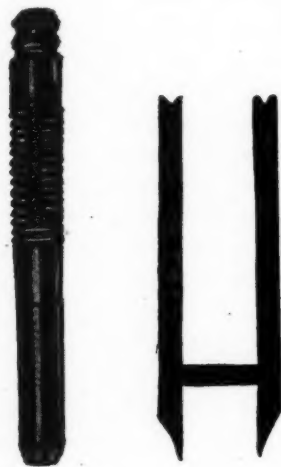


Fig. 2 (Brodsky). Cylindroconical hermetical trephine FM-III (general view and scheme).

lowing: Epibulbar and retrobulbar anesthesia; akinesia. Bridle sutures on two neighboring muscles bordering the quadrant bearing the splinter. Injection of novocaine subconjunctivally at the place to be operated on. Incision of the conjunctiva parallel to the limbus. The distance of the incision of the conjunctiva to the limbus depends on the depth of the location of the splinter. On the ends of the bridle sutures we put forceps which

by their weight extend the wound. Further extension of the conjunctival wound is accomplished by the assistant with the aid of instruments. The sclera is freed from the episclera and carefully dried. The spot of the incision (the meridian and the distance from the limbus) is measured with dividers and marked with India ink. Around this point diathermo-coagulation of the sclera is effected with a spherical tip of 1.5 mm. for 2 to 3 seconds with a current of 60-70 M.A. until a yellowish-brown color appears. Then to this part of the sclera we put a trephine FM-II to FM-III of 1.5 to 2-mm. diameter, according to the size of the splinter (on the basis of X-ray data) by which means we trephine the sclera quite easily, as a rule. The choroid remains undamaged. If necessary this aperture may be carefully and lightly enlarged by a Graefe knife. We put the magnet to the bared choroid and the foreign body then often comes out of itself, cutting the retina and choroid. In some cases, however, we have had to cut the choroid and retina. This sometimes facilitated the removal of the splinter. Seldom did we have to sound the vitreous. The reverted scleral disc is put back in its place. No suture of the sclera. Suture of the conjunctiva. Dressing on both eyes. The patient remains in bed for 6 to 7 days. The aftercare is like that prescribed after operating for detachment of the retina. In this way we succeeded in operating on 12 patients, removing the splinters in all by aid of the permanent magnet.

In most cases the splinters came out by themselves as soon as the magnet was placed to the bared choroid. In only two cases did we have to cut the choroid and retina. In one case this incision was sufficient to remove the splinter. In the other case we had to introduce the magnet end into the vitreous (in the direction of the splinter).

It should be emphasized that the diascleral method of removing splinters from the eye should no longer be a method of choice, but the preferred method for splinters in the posterior region, especially when the lens is transparent.

The anterior method of splinter removal (in the sense of bringing the foreign body from the posterior segment into the anterior chamber) is not to be ignored, but the sphere of its indications is limited.

For the right application of our magnet—that is, for its diascleral application according to exact X-ray data—the incision of the sclera is made above the place where the foreign body is located, and the distance between magnet and splinter does not exceed 12 to 13 mm. This, in most cases, assures the removal of the splinter by our permanent magnet.

Specialists using the diascleral method well know how easily the eye endures this incision, how often the diascleral removal of the splinter reduces the acute inflammation caused by invasion of germs together with the splinter (rapid vanishing of hypopyon, of fibrinous exudate at the anterior surface of the lens).

The method now at our disposal of preliminary cauterization of the part of the sclera to be intersected (diathermo-coagulation, galvanocoagulation) seems to be a reliable prevention of a possible detachment of the retina, which was until now one of the main objections to the diascleral method.

Our proposed modification of isolated scleral incision with the aid of a cylindro-conical trephine (Filatow-Marcinkowsky FM-II to FM-III) with piston or hermetical barrier inside the tube assures the convenient application of the magnet and the easy removal of the splinter without further need of violating the integrity of the choroid and retina. The opening of the sclera by this trephine can be accomplished very quickly with mini-

mal risk of damaging neighboring parts.

This scleral incision favors the successful application of our permanent magnet, which has, in some regards, essential superiority over the electromagnet, especially in cases when the magnet operation has to be accomplished in more or less primitive situations, as may often happen in war conditions.

#### SUMMARY

In magnetic surgery there are many adherents of the sole use of giant magnets, but there are quite a number of those who prefer the hand magnet. The Clinic of Academician W. P. Filatow (Odessa) and many other clinics as well are of the view that the possession of a giant magnet does not exclude the need of possessing hand magnets. Both types of magnet are needed for the proper application of magnetic aid.

Considering the inconvenience of working with giant magnets, and acknowledging the value of hand magnets, it was still before the war in 1939 when Prof. S. F. Kalfá and I proposed the use of permanent magnets in the practice of ophthalmology. The materials used for these magnets were: iron-nickel-aluminum alloy and the alloy "alnico" possessing high magnetic properties (great ultimate induction and great coercitive power). The author studied the problem of applying permanent magnets in the practice of ophthalmology in 1938. However, the first operation with our proposed magnet was performed in the Odessa Eye Clinic by Academician W. P. Filatow on the 27th of April, 1939. The splinter was easily removed from the iris.

The first model of the magnet was pearshaped. With this magnet more than 65 operations were performed for removal of splinters from the anterior as well as the posterior areas of the eye. The second model of the magnet looks

like a pencil 108 mm. in length, 20 mm. in diameter, and 210 grams in weight.

From experience with our magnet we were convinced that its greatest efficiency is demonstrated in connection with exact X-ray data in regard to the localization of the fragment in the eye. For this purpose I use the method of Komberg-Baltin.

In regard to the question of incising the sclera for the removal of splinters I have proposed modification. For isolated trephining of the sclera we employed the cylindroconical trephine FM-II to FM-III (Filatow-Marcinkowsky) with piston barrier inside the tube. The author recommends uneven pressure on the trephine when excising the scleral disc. With suitable pressure of the trephine on one side, the scleral disc is not excised completely but remains in contact with the sclera in one place. Something like a little window is the result. When the magnet is brought up to the bared choroid the splinter often comes out by itself, cutting the retina and choroid. After removal of the fragment the scleral disc is put back in its place. No suture is placed in the sclera, only in the conjunctiva.

It should be emphasized that the diascleral method of splinter removal from the eye at present is no longer a method of choice, but the preferable method for splinters in the posterior region, especially when the lens is transparent.

The anterior method of splinter removal (in the sense of bringing the foreign body from the posterior part into the anterior chamber) is not ignored, but the sphere of its indications is limited.

For the correct application of our magnet—that is, for its diascleral application according to exact X-ray data—the incision of the sclera is made above the place where the foreign body is located and the distance between magnet and



splinter does not exceed 12 to 13 mm. This distance, in most cases, assures the removal of the splinter by our permanent magnet.

Exact roentgenolocalization, accurate transference of X-ray data onto the surface of the eye, convenient incision of the sclera, and the successful application

of our permanent magnet, which has a number of essential advantages over the electromagnet, can be achieved when it is necessary to perform the magnet operation in more or less primitive conditions, such as may often obtain in rendering aid in the war.

*Ufa, Zentsova 29.*

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## NOTES, CASES, INSTRUMENTS

### UVEOPAROTID FEVER WITH BILATERAL PAPILLEDEMA\*

W. L. ROBERTS, M.D., AND

R. F. NIELSEN, M.D.

*Los Angeles, California*

Because of its obscure etiology and bizarre manifestations, uveoparotid fever (Heerfordt's disease) has stimulated a great deal of interest and speculation. Associated with the uveitis and the parotid swelling are many neurologic disturbances including peripheral polyneuritis, facial paralysis, ptosis, diplopia, recurrent laryngeal paralysis, vagal paralysis, spasticity of the lower extremities, ataxia, deafness, numbness, and paresis.<sup>1</sup>

However, we have been unable to find any reference to the presence of papilledema associated with the syndrome.

The following case is of interest, not only because of the presence of this unusual finding, but from the standpoint of differential diagnosis.

G. N. P., a white man, aged 24 years, was first seen on October 17, 1943, in the clinic, with complaints of malaise and generalized aching in all his joints. His temperature was 99.8°F., and a provisional diagnosis of influenza was made. The patient was given symptomatic treatment.

Nine days later he again came to the clinic, complaining of mild transient pains in the joints and lower extremities, without any objective findings. His temperature was 100.2°F. He was admitted to the hospital as having an undiagnosed fever. The physical examination was entirely negative, and the routine laboratory work revealed no abnormalities except

some soft infiltration at the right base in the chest film consistent with a mild persistent common respiratory infection. His course in the hospital was uneventful, the patient continuing to run a low-grade fever, and on the sixteenth hospital day a swelling of the right parotid gland was observed. This was attributed to the iodides he had been receiving. At the same time *Amoeba histolytica*, which had earlier been looked for without success, was found in the stool.

A few days later the left parotid gland became swollen. The distinctive feature of this parotid swelling was the lack of periparotid swelling, so that the parotid glands could be exceptionally well outlined by palpation.

On the twenty-ninth hospital day, the patient began to complain of redness and pain of the right eye. The ocular examination at this time revealed vision R.E. 20/30; L.E. 20/30. The results of external examination of the right eye were moderate conjunctival injection with slight ciliary injection. The pupil was slightly irregular, larger than the left, but reacted to light and accommodation; the media were clear; the disc showed definite blurring of the margin with two diopters of papilledema; no hemorrhage was seen, blood vessels were normal, except for some venous congestion, and the macula was normal.

Examination of the left eye revealed a clear conjunctiva and cornea, the pupil slightly miotic but reacting to light and accommodation; the media were clear; the disc was definitely blurred at the margin, with about two diopters of papilledema present.

A diagnosis of subacute conjunctivitis with possible iritis was made, with the

\* From Lockheed Overseas Corporation Hospital.

note that uveoparotid fever must be considered; the cause of the papilledema was undetermined at this time.

The patient ran an irregular low-grade fever of 99 to 100°F. for 32 days of hospitalization. A neurologic examination was devoid of any positive findings other than the bilateral papilledema. Skull X-ray studies were negative. The patient was sent to a nearby Army Station Hospital for further study of the spinal fluid. The spinal pressure was 90 to 100 mm. water; there were 39 cells, of which 32 were lymphocytes and 7 polymorphonuclears. The total protein was 130 mg. percent.

While the patient was at the Army Hospital, definite evidence of iritis developed in the right eye. There were a few small posterior synechiae and a slightly cloudy aqueous. The patient was treated with atropine and hot compresses, and reentered our hospital on December 13, 1943. The ophthalmologic examination at this time was: Vision, R.E. with pinhole disc, 20/50; L.E. with pinhole disc, 20/30. The right eye was semi-dilated, with a posterior synechia at the 11-o'clock position. There were definite ciliary injection and marked vitreous opacities in the right eye. It was still possible to see the fundus, and there had been no change in the papilledema of the disc of that eye.

Examination of the left eye at this time revealed definite ciliary injection; the media were clear, and fundus findings as previously noted. Because of the definite evidence now of bilateral uveitis and a persistence of the parotid swelling, the diagnosis of uveoparotid fever was made.

The patient was sent back to the United States and was followed in New York City by Dr. Townley Paton and in Baltimore by Dr. Frank B. Walsh. Both men agreed with the findings and diagnosis. The following note was received from

Dr. Walsh, who saw the patient about two months after he left our care.

"When I saw him the visual acuity was 20/70 O.D. and 20/40 O.S. The slitlamp examination of the right eye revealed deposits on the posterior surface of the cornea and what I took to be Koeppe's nodules about the pupillary margin; the ray was positive. The left eye was essentially similar with an aqueous ray only faintly positive. Ophthalmoscopic examination of the right eye showed many fine and a few heavy vitreous opacities, a blurred nerve head without measurable edema, clear macula, disseminated lesions of chorioretinal atrophy in the lower fundus, temporally and above, many of the lesions being situated along vessels. There were floating opacities in the vitreous of the left eye; the disc margins were blurred above and below, but there was no measurable edema. The macula seemed clear. Far below the disc there was a whitish mass one half the size of the disc with margins which were becoming demarcated; above this there were several such smaller masses in the temporal fundus. In the upper temporal fundus there was a single small mass, and the upper nasal fundus seemed quite clear."

The results from the laboratory work done agreed with the findings at our hospital. In addition, other tests for brucellosis were negative. Word recently received from the patient (August 15, 1944) stated that he had stopped using atropine in his eyes, and that his vision had now improved to 20/20 in both eyes. There is no ophthalmologic report available since that done by Dr. Walsh.

The family history and past history were not significant except for the fact that there was no family history of tuberculosis and the patient had mumps as a child.

Laboratory procedures gave the fol-

lowing results: Hemoglobin, 16.0 grams and red blood cells 5,040,000. The white-cell count varied between 6,900 and 9,600 on several occasions, with a normal differential count except for an eosinophilia of 5 percent and 8 percent on two occasions. Two blood-sedimentation-rate values were 4 and 7 mm. per hour. Urinalyses were entirely negative. The blood Kahn reaction was negative, as was the Mantoux test. Agglutinations for *E. typhi*, Para A and B, and *Brucella* were negative. A few trophozoites and many cysts of *Endamoeba histolytica* were found in the stool examination, but after treatment three negative stools were obtained. Examination of the spinal fluid on November 20, 1943, revealed normal pressure, 39 cells per cubic centimeter, of which 32 were lymphocytes, and a total protein of 130 mg. percent. Repeat examination on January 17, 1944 revealed 5 lymphocytes per cubic centimeter, a total protein of 86 mg. percent, and normal pressure. X-ray film of the chest on November 3, 1943, revealed a small density along the right heart border, consistent with pneumonitis.

#### COMMENT

The etiology of uveoparotid fever is still unknown. Probably the best accepted theory is that the disease is due to an unknown toxin which affects the parotid and uveal tissue, producing tuberculous-like nodules. The main controversy is whether or not it is due to tuberculosis. It is noteworthy that the tuberculin skin test was negative in this case.

The close relationship between uveoparotid fever and sarcoidosis was shown by Walsh.<sup>2</sup> He concluded that these two conditions were closely allied and would probably be proved tuberculous in origin. It might be of interest to note that Reis and Rothfeld<sup>3</sup> reported a case of sar-

coidosis in a 17-year-old girl with bilateral papilledema.

The question arises as to whether or not this case should be classified as optic neuritis or papilledema. Pathologically in optic neuritis two processes are taking place—proliferative changes in the interstitial tissue followed by degenerative changes in the neural tissues. There is marked edema and invasion of inflammatory cells with thickening of the connective-tissue septa.<sup>4</sup> If the process occurs near the distal end of the nerve, swelling of the disc results. Clinically in optic neuritis the first findings are reduced visual acuity, and pain either in the eye or on movement of the eye. Usually present is an involvement of the papillomacular bundle, with a resulting central scotoma. It is not uncommon to find in the posterior vitreous a haziness caused by fine opacities. None of these conditions was present in the case we are presenting.

Pathologically in papilledema there is simple edema of the nerve head, with edematous swelling of the nerve fibers and an infiltration of all the tissue with fluid.<sup>5</sup> The presence of inflammatory changes is rare, and any change present is probably secondary to degenerative changes in the nerve. Any loss of function of the nerve occurs late in the process. These changes are possibly due to an obstruction in the venous drainage of the optic nerve, resulting in disturbance in the metabolism, and causing a derangement in the normal traffic of the tissue fluids.<sup>6</sup> Such a venous obstruction could have been caused in our case by a plastic meningeal process along the superior orbital fissure and optic foramina in a manner analogous to that observed in luetic optico-chiasmic arachnoiditis. Such a process would produce the spinal-fluid findings of increased protein and increase in cells<sup>7</sup> without necessarily producing an



increase in intracranial pressure.

Another explanation of the swelling of the nerve head associated with spinal-fluid findings of meningeal involvement must be considered. If a plastic meningeal process were present in the region of the optic foramina this process could extend through the foramen and involve the meningeal coverings of the intraorbital portion of the optic nerve. Such a course of events could explain both the optic-nerve and the spinal-fluid findings. If the edema of the nerve head were due to inflammatory involvement of the sheaths of the optic nerve, one might expect that after more than six months of involvement there would be a spread of the inflammatory process into the nerve itself, with permanent loss of the peripheral visual field. Such was not the case with the patient under consideration.

The edema of the optic nerve discovered in this case of uveoparotid fever we believe to have been caused by a localized patch of meningitis in the region of the superior orbital fissures. This meningitis would explain the increase in protein and cellular content of the spinal fluid. The passive edema would also account for the good visual acuity and field which were present when the papilledema was first discovered before the uveitis developed.

Until the uveitis developed in this case, the bizarre history and findings produced a great problem in differential diagnosis.

The low-grade fever was at first thought to be due to a small pneumonic patch revealed by the X-ray study of the lung. Iodides were given, and coincidental with this the parotid swelling developed. The fact that the parotid swelling was so discrete with no periparotid involvement, and the long duration of the parotid swelling, associated with the subsequent uveitis, definitely ruled out the iodides as a cause of the parotitis. The next confusing finding was the presence of *Endamoeba histolytica*, trophozoites, and cysts in the stool, associated with a history of having been in the Near East. Subsequent negative stool examinations, and no other symptoms referable to amoebiasis, aided in eliminating this as a factor. A final diagnosis of uveoparotid fever was made because of the history of low-grade fever and general malaise, followed by bilateral parotid swelling, which, in turn, was followed by a bilateral uveitis.

#### SUMMARY

An interesting case of uveoparotid fever complicated by bilateral papilledema was presented. The patient first complained of general malaise, which was followed three weeks later with bilateral parotitis. This was subsequently followed two weeks later by the appearance of bilateral papilledema. The uveitis became fully developed about two weeks after the papilledema was discovered.

700 Roosevelt Building.

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## METASTATIC CARCINOMA TO THE CHOROID ARISING FROM THE LIP\*

EDWARD GOODSITT, M.D.  
*East Cleveland, Ohio*

Metastatic tumors to the eyeball are uncommon. Willis<sup>1</sup> and Usher<sup>2</sup> in their extensive studies of this condition mention its rarity, and in one series of approximately 100,000 admissions to an ophthalmic hospital only one such case was seen. The tumor occurs most frequently in the fifth decade of life and approximately 75

average length of life after its occurrence is approximately eight months, the longest two years, the shortest one month. In the majority of cases, the condition is associated with metastases to the nervous system and frequently with extensive metastases throughout the body. In some cases there may be a long interval between the treatment of the primary growth and the development of ocular metastases. The tumors most frequently involve the choroid but are occasionally seen in the ciliary body and iris. These new growths present a characteristic pathologic change, arising most frequently in the posterior half of the eye, enlarging rapidly, and extending forward sometimes to involve the ciliary body. They are discoid or plaque-like, spreading along the choroid, replacing it and lifting the retina above it. The tumor may extend into the choroidal blood vessels and backward along the optic nerve. Involvement of the sclera is rare. Ophthalmoscopic examination shows a progressively enlarging, flat, gray or mot-

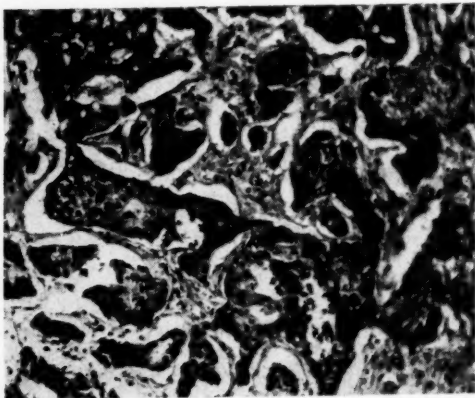


Fig. 1 (Goodsitt). Primary squamous-cell carcinoma of upper lip.

percent of the cases occur in females. The youngest patient in the series of Usher was 20 and the oldest 72 years of age. The site of the primary tumor in over half the cases in females is the breast. In males the most common site of origin is the lung. A few cases have been reported as originating in the stomach, thyroid gland, liver, kidneys, esophagus, and colon. In approximately one third of the cases the metastases involved both eyes. The presence of metastases to the eyeball, particularly the choroid, is a grave sign. The



Fig. 2 (Goodsitt). Low-power section of eye showing metastasis to choroid and tumor thrombus in vein.

\* From the Department of Pathology, Huron Road Hospital.

tioned swelling in the posterior portion of the fundus covered by retina, which is displaced forward. The usual symptoms are blurring of vision, with ill-defined scotomata due to displacement of the retina. Clinically, the tumor can be differentiated from primary tumors by the ophthalmoscopic appearance and also by the history of primary tumor in another part of the body. The case presented here

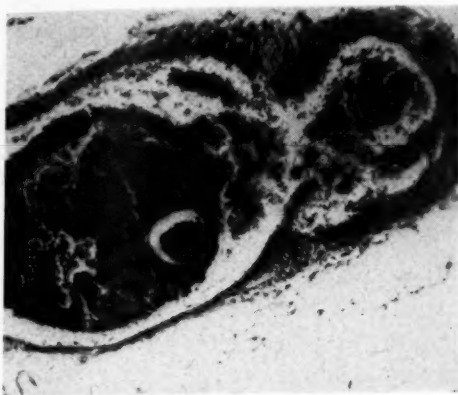


Fig. 3 (Goodsitt). High-power view of tumor thrombus in vein.

is unusual in having as the primary site a squamous-cell carcinoma of the inner surface of the upper lip removed approximately three years before the development of the ocular metastasis.

#### CASE REPORT

A white man, aged 48 years, was admitted on March 6, 1941, complaining of a swelling on the right side of the neck under the mandible. Here, there were two tumors, the larger approximately 4 cm. in diameter. There was also a growth on the inner surface of the upper lip. This was hard, approximately 3 cm. in diameter, and flat. The remaining history and physical examination were irrelevant. The primary tumor of the lip and the lymph nodes in the neck were excised. The report of pathology was squamous-cell car-

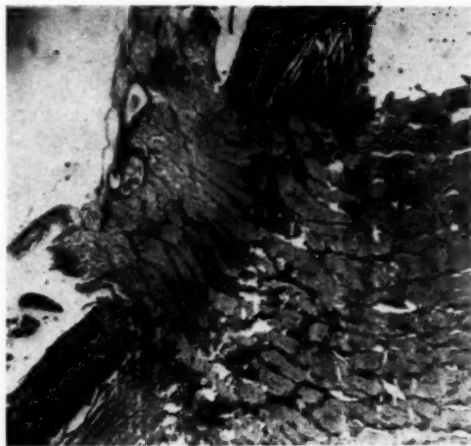


Fig. 4 (Goodsitt). Tumor in region of optic nerve, showing sharp limitation at nerve.

cinoma of the lip with metastases to the cervical lymph nodes. The patient was discharged four days later in good condition.

He reentered the hospital on September 23, 1941, presenting a painless tumor mass on the left side of the neck of three-weeks' duration. This tumor was similar to the one previously removed. It meas-



Fig. 5 (Goodsitt). Tumor invading choroid.

ured  $2\frac{1}{2}$  cm. in diameter, and was hard and fixed. There were no apparent abnormalities of the eyes at this time. This mass was removed and proved to be a metastatic squamous-cell carcinoma in the cervical lymph nodes. The patient was readmitted on November 27, 1942, because of a recurrence on the right side of the neck. A block dissection of these nodes was performed and again squamous-cell carcinoma was found. At this time there was no apparent abnormality of vision.

On February 22, 1944, he was again admitted, complaining of blurring of vision of the right eye, of approximately 6-weeks' duration. There was no pain. The vision had become progressively worse. Examination showed the right eye miotic, with extensive edema of the nerve head. The eye was enucleated, and 40 mg. of radium was implanted into the orbit for six hours. The patient made an uneventful recovery from this operation and was discharged in good condition.

Examination of the enucleated eye resulted in the following pathologic report:

Specimen consists of an eyeball measuring 21 mm. in the vertical diameter, by 22 by 22 mm., is of average size and well shaped, showing the cornea 11 mm. in diameter and transparent. The pupil measures 4 mm. in diameter, and is centrally placed. On the posterior surface, the nerve is present for a distance of 5 mm., 4 mm. in diameter, with some thickening of the nerve sheath. On section, the anterior surface shows nothing of importance. The lens is of average size, and transparent. There are no abnormalities of the ciliary body. The posterior portion of the eyeball shows the retina pushed forward by translucent gray tumor tissue 1 to 2 mm. in thickness, apparently replacing the choroid, extending radially from the optic nerve head approximately 8 to 10 mm. on all sides of the optic nerve. The retina is not detached. The sclera is

of approximately average thickness, firm, and pale gray.

*Microscopic description.* Sections of the eye taken from the ciliary region show no evidence of tumor or other abnormalities. Sections taken from the region of the posterior portion of the eye and the optic nerve show the retina to be of average thickness, with the layers intact and well defined. The choroid is replaced by tumor tissue, with a few strands of brown-pigmented tissue present in places around the new growth and in places extending between the tumor masses, apparently the remains of the choroid. A few compressed blood vessels are noted in this area. The tumor lies within the choroid layer, touching both the retina and the sclera, and consists of irregular solid masses of large polyhedral cells with large vesicular nuclei and a few mitotic figures. Masses of tumor tissue are seen within vascular channels, and in one section a blood vessel in the sheath of the optic nerve contains a mass of tumor tissue. *Final diagnosis:* metastatic squamous-cell carcinoma in choroid layer of the eyeball.

Approximately one month later the patient developed skin nodules over the right lower abdomen and died approximately three months after the operation on the eye.

#### SUMMARY

A case of metastatic squamous-cell carcinoma to the choroid of the eye is presented. Metastasis to the eye is unusual and very few cases of squamous-cell carcinoma have been seen. The metastases developed approximately three years after the primary tumor had been diagnosed. The clinical and pathologic picture due to the lesions of the eye are characteristic of other cases reported, with typical involvement of the choroid. The patient died within three months of the enucleation of the eye.



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- <sup>1</sup> Willis, R. A. The spread of tumors in the human body. London, J. & A. Churchill, 1934.  
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## REFRACTION CLINIC\*

DISCUSSION BY ALBERT E. SLOANE, M.D.<sup>†</sup>  
*Boston*

A man, aged 44 years, had worn the same prescription for glasses for 10 years. The prescription found was exactly the same as the glasses he was wearing. He complained that it was difficult for him to read a newspaper with his glasses. Our examination revealed the following data:

Vision with either eye was 20/200. It was improved to 20/20 O.U. with the following correction: R.E. -2.50D. sph.  $\oslash$  -0.25D. cyl. ax. 90°; L.E. -2.50D. sph.  $\oslash$  -0.25D. cyl. ax. 90°.

Distance	{	2 <sup>Δ</sup> Exophoria
		1/2 <sup>Δ</sup> Hyperphoria
Near	{	4 <sup>Δ</sup> Exophoria
		Orthophoria

## DISCUSSION

The symptoms of which the patient complained are typically those of early presbyopia. The fact that his distance glasses have not changed in a number of years is not unusual, since myopia of this amount is generally unprogressive and remains approximately the same after full maturity is reached. The muscle-balance findings are well within normal limits and do not contribute to the symptomatology. The problem in this case is reduced to deciding how the near-vision difficulty can best be solved.

## SOLUTION

There are two choices: First, a prescription of the near glasses of approxi-

\* From the House Officers' Teaching Clinic, Massachusetts Eye and Ear Infirmary.

<sup>†</sup> Director of Department of Refraction.

mately +1.25D. sph. added to his present glasses. The other solution would be simply to remove the glasses and allow the patient to read with his naked eyes. This decision would be greatly influenced by the occupational demands on his eyes. For example, if he were employed in such a way that it would be inconvenient for him to keep putting on or taking off his glasses, bifocals would be necessary. On the other hand, if his occupation did not require this, it would be better for him to use no glasses for near. It is true that without his glasses his far point is brought to 16 inches, which is a little close for ordinary near work. On the other hand, he would enjoy vision that is not limited to the segment of his bifocals, and a larger retinal image without any accommodative strain. In most instances such patients do best with single-vision distance glasses, and no glasses for near work. Where bifocals are necessary for near, it is well to prescribe them only to be used at work, but the patient may remove his glasses for prolonged reading.

Sometimes it is necessary to prescribe a single-vision near glass; in this case, for example, -1.25D. sph.  $\oslash$  -0.25D. cyl. ax. 90°, which would have the advantage of giving good near vision and yet not cut down distance vision as much as it would be without glasses.

It may be stated that the myopic are more tolerant of a close near point than are hyperopics, thus justifying stronger additions even to the point of removing their glasses.

## QUESTIONS

House Officer: Supposing that this was an acquired myopia due to tumescence of

the lens in a person 60 years of age, how would you handle it?

Dr. Sloane: I would tell this person that any glass prescribed for him now would not be permanent, nor could one predict how long it would be serviceable; and then I would prescribe the afore-described lens for distance and allow him to read either without glasses, or, if necessary, add plus spheres to give him still larger retinal images. In this case he would require no glasses for near.

H.O.: Assume that this person were given bifocals with a +2.50D. sph. addition so that the reading portion would parallel wearing no glasses at all. Does the patient see as well as without glasses?

Dr. Sloane: Although the optical effect is practically zero, the patient sees better without glasses at near.

#### A SIMPLE RUBBER FORM FOR THE RECONSTRUCTION OF A CONTRACTED SOCKET\*

LORAND V. JOHNSON, M.D.  
Cleveland, Ohio

For some time, I have been using a form, trimmed from the end of an ordinary ear syringe, in the reconstruction of a contracted socket. It works so well that I am prompted to invite its trial by others, who probably, like myself, have

\* From the Department of Surgery, Division of Ophthalmology, Western Reserve University Medical School, and the University Hospitals of Cleveland.

been annoyed when trying to remove a single molded form, or finding that a bivalved form has slipped.

The central hole allows for drainage, and a silk suture tied to the ridge facilitates removal in children. I like best an

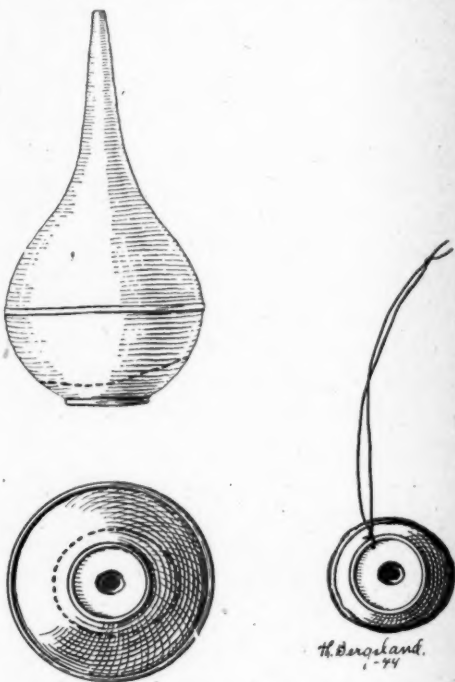


Fig. 1 (Johnson). Simple rubber form for reconstruction of a contracted socket.

old syringe that has been boiled repeatedly, since it is more flexible for inserting and removing. A little ointment on the inner side facilitates the spreading of the skin graft, and the form is easily inserted by compressing it with a large-toothed forceps. I have seldom been able to get such a large socket with a rigid form.

# SOCIETY PROCEEDINGS

EDITED BY DONALD J. LYLE

## NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

November 6, 1944

DR. MILTON L. BERLINER, *presiding*

### PATHOLOGIC ASPECTS OF TUBERCULOUS UVEITIS

DR. JOSEPH IGRSHEIMER stated that tuberculosis can produce acute anterior uveitis in experimental as well as in human pathology. The tissue reaction takes place according to the immunobiologic condition of the organism. The inflammation may be very temporary and may be similar to the clinically so-called rheumatic iritis. Another variety of the fugitive type of reaction is the Gilbert-Koeppel nodule. Chronic uveal tuberculosis may appear in different forms. The caseating variety with large nodules is a rarity nowadays. More frequently there are smaller nodules which develop, disappear, and reappear during the course of a chronic uveitis. The Koeppel nodule is not pathognomonic and may be seen also in syphilis, leprosy, and sympathetic ophthalmia.

Pathologic studies yield data on the relationship between tuberculous infection and chronic, uncharacteristic uveitis: (1) The tuberculous focus often lies in the ciliary body or in the root of the iris, whereas the visible iris shows only an uncharacteristic inflammation. The clinical appearance is not characteristic because the ciliary body most often is involved. (2) Occasionally hidden foci in the retina or in the vitreous near the retina have been found without specific inflammation of the anterior uvea at the time of enucleation. When visible clinically, such foci are whitish or bluish-

white in color. (3) The longer the course of the uveitis, the more likely it is that there will be new-formed connective tissue, but even in old stages of uveitis with abundant neoformation of connective tissue, inflammatory foci of nodular character may be seated deeply within the globe. (4) Inflammation within the globe may be found in cases in which all irritation and redness of the eye have disappeared. (5) There are cases of certain tuberculosis in other parts of the body concomitant with uveitis in which the anatomic findings in the eye are not specific. (6) In rare instances a uveitis of uncharacteristic nature occurs with a severe, necrotizing tuberculosis of the retina and choroid.

### OCULAR TUBERCULOSIS. CLINICAL MANIFESTATIONS, DIAGNOSIS, PATHOGENESIS, AND TREATMENT

DR. ALAN C. WOODS listed the various clinical manifestations of ocular tuberculosis: (1) Conjunctivitis. (2) Keratitis: (a) phlyctenular keratitis, (b) sclerokeratitis, (c) interstitial keratitis, (d) deep, central keratitis, (e) tuberculous infiltrates of the cornea, and (f) ulcerative keratitis. (3) Tuberculous disease of the anterior uvea: (a) simple iritis, (b) nodular iritis, and (c) conglomerate tuberculoma. (4) Tuberculous disease of the posterior uvea: (a) circumscribed recurrent lesions, (b) acute caseating lesions, (c) miliary lesions, (d) solitary tubercles, and (e) tuberculoma. (5) Scleritis. (6) Tuberculosis of retina: (a) superficial type, and (b) Eales's disease. (7) Tuberculosis of optic nerve: (a) from tuberculous meningitis, and (b) secondary to tuberculous periphlebitis.

The character of the lesions may vary.

They may be necrotizing and destructive, drawn-out uveitis, or evanescent lesions with focal reactions, as is seen in phlyctenules. These conditions are considered tuberculous because of the correlation of clinical findings with known pathologic material and because these lesions can be produced experimentally in animals. It is difficult to say whence they arise, as they are infrequent in cases with frank, open tuberculosis and are so commonly seen in healthy people with no tuberculosis or old healed lesions. They probably are for the most part of mediastinal origin, the lesion there rupturing into a vessel and lodging in the eye. The immunobiologic status of the patient determines the type of resultant lesion.

Diagnosis depends on four factors: (1) The clinical picture, which can be only strongly suggestive, as sarcoidosis or brucellosis may have the same appearance. (2) Elimination of other causal factors, and determining the effect of eradication of foci of infection. (3) Demonstration of other tuberculous foci either by physical signs or X ray, the total positive findings being 65 to 70 percent of all cases of ocular tuberculosis, which means, in other words, that many cases do not have a demonstrable tuberculous reservoir. (4) The tuberculin reaction, which must be performed with the use of high concentrations of tuberculin if the higher dilutions give no reaction. It must be remembered that ocular sensitivity does not equal cutaneous sensitivity, the latter possibly being low while the former may be great.

The pathogenesis of these tuberculous lesions varies. They may be caused by the actual invasion of the tissues by the tubercle bacilli, by toxic substances diffusing from a tuberculous focus, or by hypersensitivity of tissues to tuberculo-protein. The nature and course of the lesions after infection are dependent on

a balance of the following factors: (a) the number and virulence of the invading organisms, (b) the degree of hypersensitivity of the tissue, and (c) the degree of resistance or immunity.

Treatment may be considered from three aspects: (a) enhancement of resistance or immunity, as by general hygienic measures or repeated paracentesis; (b) direct attack upon the tubercle bacilli, looking toward their destruction or attenuation, by means of colloidal gold (which is not recommended), nonspecific-protein therapy, especially in early cases to pass the acute phase before tuberculin can be used, and phototherapy which in general has not been satisfactory; and (c) removal of fatal tissue sensitivity by the use of tuberculin according to the concepts of Rich. The tuberculin is administered for the purpose of desensitizing the tissues to tuberculo-protein and not to produce a perifocal reaction. It must be commenced in infinitesimal dosage which is gradually increased. If at any time a reaction occurs the dosage is markedly reduced. The administration of tuberculin must be maintained for a long period of time to continue the desensitization.

*Discussion.* Dr. Isadore Givner requested that Dr. George Ornstein discuss the use of diasone in the treatment of tuberculosis. He understood that it was a dangerous drug.

Dr. George Ornstein admitted that he had had one fatal case in his series treated with diasone but believed that henceforth there should be no fatalities. Evidence of reaction must be watched for, the most important being cutaneous and calling for immediate cessation of the drug upon its appearance. The blood and urine must also be watched and if these precautions are taken the drug is quite safe.

Dr. Milton Berliner asked whether there could be a specific organic heredi-



tary tendency for tuberculous infection. He said that in some quarters it is held that even part of an organ—for example, the iris—may be susceptible.

Dr. Ornstein stated that there is no hereditary factor of this kind in tuberculosis. Whenever the bacilli enter the body the disease is present. Statistics disprove the former belief that certain groups have an hereditary tendency to the disease.

Dr. Woods agreed with the statement by Dr. Ornstein that ocular tuberculosis does not occur without the actual presence of the tubercle bacilli in the eye. He took exception to the pronouncements of those ophthalmologists who speak of allergic tuberculous ocular disease, meaning that the allergic phase of the disease—namely, the acute inflammatory phase—is predominating in the clinical picture. One reason for the rarity of proof of the presence of tubercle bacilli in eyes having been regarded clinically as tuberculous is that when they have been removed they are rarely ground up and injected into guinea pigs. Instead they are sectioned and the difficulty of finding the bacilli in microscopic sections is well known. Experimentally, if the eyes of guinea pigs after recovery from induced ocular tuberculosis are enucleated, even after several years of apparent healing, and ground up and injected into guinea pigs, there will almost invariably be a positive take. On the other hand, upon sectioning these animals' eyes it is extremely difficult to find the bacilli.

Dr. Woods emphasized the fact that when tuberculosis is produced in the eye, whether as a primary or secondary lesion, there may be a local development of tissue sensitivity out of all proportion to the sensitivity of the body as a whole.

Leon H. Ehrlich,  
*Secretary.*

## LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

November 27, 1944

### SIMPLE GLAUCOMA

DR. ETTA C. JEANCON discussed the factors involved in the diagnosis of chronic simple glaucoma and the provocative tests now in use. Among others she mentioned the use of coffee, euphthalmine, large quantities of water, and sitting in a dark room. She then projected the visual fields and discussed the case histories of 28 patients, and pointed out how the diagnosis had been missed or might have been missed in these cases. Dr. Jeancon took a conservative attitude in relation to surgery. She believed many of these people could be carried along for many years by judicious use of miotics.

*Discussion.* Dr. C. H. Albaugh mentioned that occasionally euphthalmine may be a dangerous drug. He cited a case that had been seen by Dr. Allan Greenwood in Boston. The patient developed an attack of acute congestive glaucoma following one drop of euphthalmine. Dr. Albaugh also referred to a similar case from his own experience.

In reply Dr. Jeancon wished to state that she did not advocate the use of euphthalmine as a provocative test but merely mentioned it to include it as one of those in current usage.

### PATHOLOGY OF SIMPLE GLAUCOMA

DR. MAURICE N. BEIGELMAN pointed out that because so few cases become available for pathologic study when glaucoma is in its early phases, much about the early pathology of chronic simple glaucoma is unknown. He stated that to his knowledge there were only three such cases reported in the literature. These showed abnormal processes only in the

optic nerve. Dr. Beigelman described some of the terminal phases of simple glaucoma, such as the absence of muscle fibers in the sphincter muscle of the iris, which he felt makes it unlikely that miotics would be of much benefit. Furthermore, the vessels in the eye have become sclerotic and recurrent hemorrhages frequently are seen. He said that one of the causes for uncontrolled intraocular pressure following surgery is that there is an incarceration of uveal tissue in a trephine wound, usually of ciliary processes which move forward into the opening.

His recommendation was that early surgery be done before these terminal structural phases have an opportunity to present themselves.

C. H. Albaugh,  
*Reporter.*

#### ANNUAL MEETING OF THE DEPARTMENT OF OPHTHALMOLOGY, THE GEORGE WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

December 2, 1944

DR. ERNEST SHEPPARD, *Executive officer*  
Washington, D.C.

#### OPHTHALMIC INJURIES INCIDENT TO WAR

COL. JOHN L. MATTHEWS (MC), School of Aviation Medicine, Randolph Field, Texas (by invitation), stated that ophthalmic injuries caused by "blast" of high explosives, in the atmosphere or in water, have increased in the present war. The pathologic picture produced by the two is essentially similar; retrobulbar hemorrhages, retinal and choroidal ruptures, cataracts, and dislocations of the lens. Lesser damage includes "traumatic keratitis," rupture of Descemet's mem-

brane, and transient opacification of the substantia propria of the cornea.

Intraocular foreign bodies are most frequently of low magnetizability. Several ingenious methods of X-ray localization have been devised for use under field conditions.

Penicillin is of value in the handling of ocular perforations.

Macular burns from solar exposure are being reported among personnel stationed in the tropics.

The pathology and treatment of lesions due to chemical-warfare agents were briefly reviewed.

#### PARTIAL PENETRATING KERATOPLASTY

MAJOR JAMES SPENCER DRYDEN (MC) (by invitation), demonstrated partial penetrating keratoplasty on rabbits' eyes and made a preliminary report on his experiments. Major Dryden will report his findings in full later.

#### A FOREIGN BODY IN THE LACRIMAL SAC

DR. FRANK D. COSTENBADER presented a paper on this subject which has been published in this Journal (July, 1945).

#### CORNEAL DYSTROPHY WITH INCREASED OCULAR TENSION

DR. STERLING BOCKOVEN presented the case of Mrs. E. P., aged 46 years, seen for the first time on August 20, 1943. The cornea of the left eye was steamy. The corrected visual acuity was 20/100. The pupil was dilated in the routine examination, following which the tension was 30 mm. Hg (Schiotz); this was lowered with eserine. The cornea was more steamy as the tension rose to 30 mm. again and became less so as the tension decreased. Pilocarpine was prescribed, and on August 24, 1943, the corrected vision was 20/70. The cornea remained somewhat cloudy and this involved the deeper layers. The anterior chamber was shallow and

there was a congenital defect in the iris.

On January 21, 1944, a trephining was performed. This lowered the tension but it rose again, and on March 24, 1944, another trephining was performed. Following this the corneal epithelium broke down repeatedly with numerous staining areas. The medication included pilocarpine drops; denatured bacterial antigen, hypodermically; and riboflavin and vitamin B, by mouth.

A complete physical examination revealed no systemic pathology and the diagnosis of corneal dystrophy with increased ocular tension was concurred in.

The tension remained high, and on September 24, 1944, a cyclodiathermia was performed. On October 16, 1944, the tension was 15 mm., and there was some wrinkling of Descemet's membrane and a general roughening of the corneal epithelium. When last seen the patient was using homatropine drops, riboflavin, and vitamin A.

*Discussion.* Dr. C. R. Naples said that this particular type of corneal haziness, due to prolonged increase of intraocular pressure, does not disappear when the intraocular pressure is relieved. In this type there is a definite edema, due to the impediment which prolonged pressure causes to the diffusion of lymph. Fluid accumulates between the lamellae and around the nerve fibers.

There was also an atrophy of the iris and ciliary body, most likely following the cyclodiathermia, which was the only procedure that seemed to lower the tension.

Dr. Ronald Cox said he did not think that the corneal condition which Dr. Bockoven's patient had, was a true dystrophy. He did not know whether a cornea could be perfectly normal for 40 years and then develop a true dystrophy, such as Vogt's dystrophy. He believed that the corneal nebulae in this case were

a result of the chronic glaucoma. Perhaps this is an academic differentiation, but to him this was not a dystrophy *per se*.

Dr. Leonard E. Goodman said he would like to have Dr. Bockoven describe the type of diathermy and the technique he used on this patient.

Dr. Frank D. Costenbader said that this patient had a low-grade increase in tension combined with corneal opacity and some associated epithelial bullae. He did not believe this was a true case of corneal dystrophy, as it is usually understood, but that the low-grade tension combined with some damage to corneal endothelium rather completely accounts for the whole picture. Patients who had congenital glaucoma (buphthalmos) in which the tension was not much increased have been seen, but the cornea was steamy due to a rupture in Descemet's membrane. As soon as this moderate elevation in tension has been relieved by paracentesis, the cornea clears. Also cases have been seen in which very satisfactory cataract extractions were done but the anterior chamber failed to re-form, the vitreous or iris was adherent to the posterior surface of the cornea, endothelial damage took place, and increase in pressure occurred. In other words, the very moderate increase in tension plus damage to the endothelium, could well explain the whole picture in this case.

Dr. Sterling Bockoven, in closing, said that he placed too broad a meaning on the term dystrophy. There may have been some damage to Descemet's membrane, with some infiltration into the stroma of the cornea. Then with the reduction of the tension the edges of possible tears would be brought together and less fluid could get in, with resultant clearing of the cornea. The fact that there is some atrophy of the iris along with the glaucoma made one think that the eye had not been normal for some time.

In the cyclodiathermia he made a wide conjunctival flap and made multiple diathermic punctures into the ciliary body. He included the upper half, and made about 12 punctures. The regular Walker unit was used.

#### PULSATING EXOPHTHALMOS

DR. RONALD COX presented R. C. E., a Negro, aged 52 years, who was thrown from a swiftly moving motorcycle on September 26, 1944. He was thrown against a post and knocked unconscious. He remained in this condition for two weeks during which time X-ray examinations showed that he had a fracture "across the middle of the petrous portion of the sphenoid bone."

Upon regaining consciousness, he was annoyed by a buzzing in the left ear, which persisted day and night. He also noticed that the left eye bulged forward somewhat, and that the vision was quite dim.

During the next week the left eye became more proptosed and bloodshot and vision disappeared completely. The eye was then so exophthalmic that the lids could not close over it, and the patient was sent to an ophthalmic clinic.

He was seen in the clinic for the first time on October 10, 1944, at which time the right eye was essentially normal. The vision of the right eye was 20/15. The left eye was proptosed 10 mm.

The eyeball showed marked chronic passive congestion, and the cornea was hazy and edematous. Ophthalmoscopic examination through the hazy media revealed atrophic pallor of the nerve head. There was a loud systolic bruit over the left side of the neck, and also over the upper lid of the left eye. A diagnosis of pulsating exophthalmos was made, and the patient was referred for an arteriogram.

*Discussion.* Dr. Leonard Goodman said

this case was interesting because it brought to mind an unusual cause of proptosis. This patient also had a left facial paralysis. Apparently there was no aberration of smell or taste. He said when he was an interne he had had the pleasure of helping Dr. Harry Kerr operate on a patient who had a similar condition following an automobile accident. The common carotid was ligated in two stages, first partially, then completely. The object of the double operation was to allow time for adjustment of the cerebral circulation to avoid paralysis or a fatal termination. About 10 percent of the patients who undergo ligation of the common carotid die. As Dr. Cox mentioned, these cases may not always be traumatic in origin. The traumatic ones are easy to diagnose but if there is no history of trauma one must be on guard to think of arteriovenous aneurysm as a possible cause of the proptosis.

#### MUSCLE PARALYSIS—CASE REPORT

DR. ERNEST SHEPPARD illustrated the case of S. W., a man, aged 19 years, by motion pictures. The following diagnoses were made: paralysis of the left inferior oblique, paralysis of the right superior oblique, concomitant exophoria, and anisometropia.

The vision was R.E. 20/70, corrected to 20/20-2 with -1.25D. sph.  $\approx$  -.25D. cyl. ax. 75°; L.E. 20/200, corrected to 20/15-4 with -5.25D. sph.  $\approx$  -50D. cyl. ax. 120°.

Without correction the right eye was used for distance fixation and the left eye for near fixation.

The head was tipped to the left shoulder, rotated to the right, and depressed. An advancement of the right inferior rectus was performed by the late Dr. William Thornwall Davis, which resulted in a reduction of the right hyperopia from 30 to 4 prism diopters.



The diagnosis of paralysis of the left inferior oblique was based on limitation of motion of the left eye in the upper nasal field, overaction of the right superior rectus, secondary contracture of the left superior oblique, marked right hypertropia (plus vertical divergence) when the head was tipped to the right shoulder, and no hypertropia when the head was tipped to the left shoulder.

The diagnosis of paralysis of the right superior oblique was based on the limitation of motion of the right eye in the

lower nasal field, overaction of the left inferior rectus, secondary contracture of the right inferior oblique, marked right hypertropia when the head was tipped to the right shoulder, and no hypertropia when the head was tipped to the left shoulder. In this case the very marked right hypertropia when the head was tipped to the right shoulder was due to the summation of the effect of the vestibular reflex present in paralysis of these muscles.

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## THE EDITOR'S FAREWELL TO ARMS

Back on the job after three years of service with the Army, your editor finds himself once more in charge of the destiny of one of the finest and most influential ophthalmic journals in the world. Emerging from another life which was exciting, challenging, and stimulating, he is amazed to find that during these long bitter years of warfare, hardships, and shortages that encircled and gripped every civilian venture, the prestige of the Journal is enhanced, its circulation increased, its scientific contributions growing in quality and quantity, and the number of its friends

and collaborators nearly double that of prewar years.

This extraordinary phenomenon appears at first sight to be a paradox. When one looks more deeply beneath the surface, however, one sees the cause. It is that of magnificent loyalty and team work of the entire staff under the experienced and wise guiding hands of the former editors, Dr. Post and Dr. Crisp.

With his usual modesty, Dr. Post, in a previous editorial, justly lauded the faithful members of the staff, effacing himself and minimizing his leadership. It is time to get the record straight and pay proper honors to the former chief-editor,

who stepped back into the vacuum without hesitancy at a time when his other responsibilities had increased almost beyond endurance, and 40 hours of work had to be accomplished in 24. Each number of the Journal during the war is a glowing witness to his wisdom and ability and to his burning interest in the welfare of ophthalmology. Each number, too, is a witness to the devotion of the staff under his brilliant direction. No more needs to be said. The record stands for all to see, and all of us are grateful.

We are grateful, too, to Dr. Crisp for his work during these years. At a time in his life when with honor and laurels he might have turned over to other hands the arduous task of editing abstracts of ophthalmic literature much of which was difficult of access, he continued on with increased vigor and will, because he was indispensable, and the Journal would have sustained a grievous wound by his resignation. For over a decade his editorials, faithfully appearing in these columns, have guided and helped ophthalmologists the world over. Those of the war years were particularly helpful, for they breathed wisdom and stability at a time when fiery chaos was everywhere.

It is good to be back among people such as these.

Derrick Vail.

#### BLINDNESS FROM ONCHOCERCA

Trachoma is still the world's greatest cause of blindness. But as a common disease it has receded from many civilized areas, and it has shown itself more and more susceptible to various forms of treatment. There is another cause of blindness which is estimated to affect more than a million persons throughout the world, and yet which is hardly known by name to most ophthalmologists. This

disease, onchocerciasis, although its causative agent is well understood, is essentially incapable of treatment by any known remedy. Furthermore, the possibility that this disease may ultimately affect civilized populations to which it is at present unfamiliar is by no means to be excluded.

Human ocular onchocerciasis is widely endemic in many African areas of the British Colonial Empire, and has been found widespread in southern Mexico and Guatemala. It is due to infestation with the microfilarias of a threadworm, *Onchocerca*, which invade almost all parts of the eye and lead slowly to complete blindness from corneal opacities, cataract, chorioretinal degeneration, and optic atrophy. An investigation of its incidence in the Gold Coast of equatorial Africa has recently been made by Harold Ridley, of the Royal Army Medical Service (British Journal of Ophthalmology, Monograph Supplement X, 1945) who laments that lack of realization of the importance of the disease was demonstrated by absence of mention at a discussion held in London in 1944, on "Important diseases affecting West African troops."

In Africa, research has attributed the disease to a filaria named "*Onchocerca volvulus*"; while in Guatemala the responsible parasite is called "*Onchocerca caecutiens*" ("the blinding filaria"). The two organisms are presumably identical, and there is a probability that the disease was primarily African and was originally imported to the Americas with the slave trade. The disease is carried by the fly *Simulium*, which breeds in running water at altitudes from sea level to 4,500 feet. *Simulium* is an intermediate host. Man is the true host of this filaria, since he carries the organism during its sexual stage.

Much work on the subject has been done by Pacheco-Luna of Guatemala. At the Cleveland Pan-American Congress, Pacheco-Luna showed some remarkable

cinematographic film illustrating the life activity of the microfilaria.

Ridley suggests a distinct possibility that the disease may spread to temperate climates. Twenty-nine cases of onchocerciasis have been recorded in Europeans, although only four of these patients had ocular lesions. Adequate clothing provides more or less protection, but Ridley thinks that British soldiers who served in Africa may show the disease after the war. It is estimated that an area of about five million square miles of the earth's surface, with a population of something like one hundred million, is exposed to the disease.

There are many varieties of onchocerca, all being ovoviviparous threadworms. Clinically, the primary manifestation of the adult onchocerca takes as a rule the form of subcutaneous nodules. The life history includes four stages: the adult, the egg, and the microfilaria, all found in man, and the larva, found in insects, chiefly the fly *Simulium*. The adult organism inhabits the subcutaneous nodule, in which the eggs are produced and hatched.

The American variety of the fly *Simulium* is said to bite the human victim about five feet from the ground and therefore rather commonly on the head. Like certain snakes, the saliva of this fly contains an anticoagulant. The insect sucks blood for one and a half to five minutes, and, once having begun to suck, can continue to do so even under water.

The subcutaneous nodules which develop as a result of human infection range in size from "that of a pea" to an inch or more in diameter. In a case seen in Africa by Strong (quoted by Ridley) there were 150 of these nodules, although nineteen was the largest number of nodules discovered in any of the cases studied by Ridley.

Ocular involvement is thought to be

more likely when the nodules are close to the eye, although the site of the nodule has no definite connection with that of the original bite. Nettel (see *American Journal of Ophthalmology*, 1945, volume 28, page 1061, and second abstract, page 1062) who gives careful instructions for study of skin lesions, considers that the principal and most frequent route by which microfilarias reach the eye is through the skin of the lids by way of the palpebral conjunctiva. Other organisms probably reach the region of the eye by way of filarial nodules deeply situated at the base of the skull.

In most of the cases in which the eye is infested, the cornea is involved. Only very gradually do ocular symptoms develop, the early manifestations being lachrimation and photophobia. In later stages the conjunctiva is thickened and has a "marbled appearance." The typical appearance of the cornea progresses from tiny circular opacities in the stroma, most commonly in the interpalpebral area, to a frosted appearance in the lower third of the cornea.

Apparently the corneal opacity is not produced until after the death of the microfilaria. Torres Estrada (*American Journal of Ophthalmology*, 1945, volume 28, page 1063) emphasizes the striking fact that, as the lesions of the disease pass from the microscopic to the macroscopic phase, the microfilarias gradually diminish in number, so that when blindness has developed it is extremely difficult to find even a few parasites in microscopic sections.

It must be remembered that the microfilaria is seldom more than 0.3 mm. in length. Only once in more than one thousand examinations did Ridley see a living microfilaria struggling in the corneal stroma. Next day the worm was dead, and in about a week the typical opacity developed around the dead worm. Ulti-



mately the lower part of the cornea takes on the appearance of "a mass of chronically inflamed tissue."

Microfilarias are frequently seen swimming in the aqueous, the best place to begin to look for them being the lower nasal quadrant a little behind the cornea. They disappear after a few minutes exposure to the beam of the slitlamp, but reappear after exposure to subdued daylight.

Further ocular lesions include plastic iritis with posterior synechia, this condition being relatively mild and seldom in itself a cause of blindness; a mild serous type of cyclitis; complicated cataract; and important changes in the retina, described as "quite distinctive, the nearest approach being perhaps a hypothetical combination of choroidal sclerosis with retinitis pigmentosa. Typically there are one or more large and approximately circular areas of tapetoretinal degeneration many disc-diameters in size, situated posterior to the equator and generally extending to the disc margin. . . The retina is abnormally transparent and its pigment heaped into one or more masses."

The literature contains various descriptions of microfilaria as seen in the conjunctiva, cornea, and vitreous. The most successful method of diagnosis of ocular involvement is said to be by snipping off a small piece of bulbar conjunctiva with forceps and scissors, under cocaine anesthesia, examination of the fresh, unstained specimen being then made with the low power of the microscope, in normal saline solution and beneath a cover glass.

Zoology and botany present numerous instances of the migration of an organism to new environment where it takes on the proportions of a plague. It seems reasonable to assume that such migration is responsible for various common infestations of the human body, and that such migrations will in the more or less distant

future create new disease and public-health problems for solution by medical science.

W. H. Crisp.

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#### BILL TO ESTABLISH AN OPTOMETRY CORPS IN THE MEDICAL DEPARTMENT OF THE U. S. ARMY

Under the sponsorship of Congressman Dewey Short of Missouri, hearings on a bill to establish an optometry corps in the Army Medical Department were held by the Committee on Military Affairs of the House of Representatives from June 28 to July 9, 1945. This bill, in its original form, contained many features that were objectionable from every viewpoint except that of the optometrists. These individuals presented a militant, organized, and united attack. They were prepared and aggressive. They employed the same noisy tactics that they have so often used in the past in order to get their schemes through the various state legislatures. Letter writing, affidavits, and telegrams to the members of the Committee and other Congressmen played a major role in their campaign. A campaign of which, incidentally, few of the members of the medical profession are aware.

The bill in its original form (H.R. 1699) was modified as the result of the hearings. In spite of these changes the bill is still strongly opposed by the Secretary of War, the War Department, the Air Surgeon, and the Surgeon General of the Army. It is now known as H.R. Bill number 3755, has passed the House and has been submitted to the Military Affairs Committee of the Senate for action.

It is important to bear in mind the dates of this hearing. V-J Day had not yet arrived. The country was still at war, the end of which could not be foreseen. It

shows to what extent and with what selfish vigor the optometric groups will go. The time of this important congressional committee and that of the War Department, the offices of the Surgeon General and Air Surgeon were tied up for several weeks in the gathering of statistics and figures and the preparation of statements and in the actual hearings. Urgent and more important matters vital to the actual war effort and necessary for the medical care of the sick and wounded soldiers were struggling for attention and competing for time.

Briefly, the bill proposes to establish a corps of optometrists as an integral part of the Medical Department of the Regular Army. Optometrists who are graduates of schools approved by the Council on Education and Professional Guidance of the American Optometric Association are to be commissioned to the number of 60 officers in all grades from that of second lieutenant to that of colonel. Provision for admission of candidates to the Reserve Officers' Training Corps, the last two years of training at Government expense, is likewise a part of the bill. Officers of the Optometry Corps are to be assigned to optometric duty or administrative duty in connection therewith. When assigned to optometric duty, they are to perform optometric work determined upon by the appropriate medical officer, who must be an ophthalmologist.

There is no question about the valuable work done by Army optometrists in this war, especially in the early chaotic stages of induction, screening, and preparation. Millions of soldiers were refracted and millions of pairs of glasses were ordered. It was the established policy of the Medical Department that all refractions were to be done under the supervision of an ophthalmic medical officer who was in charge and responsible for this work in each particular clinic. The overwhelming

numbers of refraction cases obviously made active supervision impossible, and the optometrist was often entirely on his own, although theoretically supervised by the medical officer. It was assumed by the Surgeon General that the responsible medical officer had made himself familiar with the work of his optometrist and could know whether or not it was to be trusted. But here, again, especially in the early overwhelming days, checks and re-checks could simply not be made, for there were not enough ophthalmic medical officers available. As the result, the optometrist often had an exaggerated opinion of his work, resented his lack of commissioned rank, and writhed under the indignity of being a private soldier or non-commissioned officer, as unworthy of the "Eye Doctor" of the unit. The exaggerated opinion of the purely technical nature of his work was in marked contrast to that of the rear gunner, or the laboratory technician, or maker of dental prostheses in the hospitals, or, of innumerable enlisted men, many of them college graduates, in all sorts of technical, highly skilled, and often dangerous positions. The arguments brought out during the hearings by the optometrists emphasized this attitude of hurt ego. The argument made by representatives of the Surgeon General that "any intelligent soldier can be trained to do the work of an optometrist in the Army in six months" (meaning refraction), and shown to be true, was a body blow and considered by the optometrists to be below the belt, although there are many state-licensed optometrists, working and advertising in civilian life today, whose training in refraction was not more than from six weeks to six months. In the Army, the optometrist was used primarily for refraction, later in some cases for perimetry, and in the field for opticians' work. He became the valuable assistant to the

ophthalmic medical officer in many cases, with mutual profit and in an atmosphere of respect and friendship. But in all cases met with overseas, the optometrist was supervised by and responsible to the ophthalmic medical officer. In many cases, too, the ophthalmic medical officer felt that the services of his faithful optometrist ought to be recognized by promotion to warrant or commissioned grade, with the same praiseworthy interest that the pilot of a plane had for his rear gunner.

The War Department and Surgeon General's Office undoubtedly made a mistake in the beginning, by not establishing a top non-commissioned grade for the optometrist in various medical units. This was belatedly rectified and in the new Tables of Organizations the optometrist is given high non-commissioned status.

However, the creation of a separate corps of optometry is another thing. It undoubtedly will create cleavage, friction, and disharmony, and the professional care of the soldier who falls between will suffer. It would be wiser to reward services by a warrant or even commission in the Medical Administrative Corps or Sanitary Corps, provided that the optometrist is always responsible to an ophthalmologist. The joker here is that there are relatively few medical officers of the Regular Army who are ophthalmologists certified by the American Board, for in peace times the medical officer does all types of medical and surgical work including ophthalmology.

In the February, 1945, issue of the Journal of the American Optometric Association the statement was made by the president of the American Optometric Association, Inc., that "The Army Medical Department, by necessity, was forced to use the skills of the optometrists in visual care (sic), but it still refuses to accord them any professional (sic) recognition." This statement emphasizes the

two fallacies that the optometrists are so eager deliberately to get across in order to confuse the public. "Visual care" to the optometrist means something entirely different from what it means to the ophthalmologist. But the optometrists as a body have succeeded in their attempt to have it mean the same thing to the public, who is wittingly misled by false advertising such as "eye sight specialist" and "eye doctor." If the word "refraction" had been substituted for the term "visual care" in the foregoing quotation it would be too near the truth to suit the optometrist. "Professional recognition" is the old scheme to lift up a trade or commercial enterprise by its own bootstraps, or as the optometrists themselves use the phrase "from downstairs to upstairs," as if the mere move itself made a profession out of what essentially is a technical trade.

The medico-legal aspect of the practice of optometry was discussed during the hearings. The charge was made and not satisfactorily refuted, that optometrists are held to be irresponsible for a mistaken or missed diagnosis of an ocular disease. The charge was backed up by legal citation (Hampton vs. Brackin's Jewelry and Optical Co., Inc., 86 Southern 173, Supreme Court of Alabama). This court held that "since the disease of the plaintiff's eyes was not one that should have been detected by a skillful optometrist there was no legal liability." The optometrists in their testimony made a great to-do about the many courses given by the recognized schools devoted to teaching the students ocular and general pathology qualifying them for the detection of diseased conditions. Thus we see the curious phenomenon of a "profession" having it both ways with the helpless public in the middle. If the optometrist who "treated" a glaucomatous patient, for example, by frequent changes of expensive glasses until hopeless blindness ensued were held

legally liable, as is the physician, for his mistakes, the entire picture would change overnight, and we would see few optometrists eager to call themselves "eye doctor."

The move by the optometrists to obtain more recognition and prestige by the creation of a separate army medical corps is one that may have far-reaching effects in civilian life. It is subtle and clever. Armed with the authority of the bill, the optometrists can take the next step to persuade recognized universities to form faculties of optometry, a step which the majority are undoubtedly reluctant to take, for no new faculty of optometry has been established in any of our national, state, or municipal universities for about 20 years. Thus we see that this is not just an Army problem nor exclusively Army business. It is a problem that affects the entire medical profession, an important part of whose function is the safeguarding of the health of the public.

The report of the hearings occupies 123 pages of closely packed print and thus it cannot be reproduced here. Those who are interested, and the entire medical profession should be, will find much to stimulate their thinking and put them on the alert. A copy of the report (H.R. 1699) of the hearings can probably be obtained by writing to one's Congressman, and it is urged that this be done speedily. At the same time a protest against H.R. 3755 should emphatically be made to the members of Congress and particularly to the Chairman of the Senate Committee on Military Affairs, Senate Office Building, Washington.

It is conceded with admiration, too, that the better elements of optometry are striving to clean their house and rid it of advertising and the jewelry, drugstore, neon-sign type of optometrists. This house cleaning has a long way to go. A walk in any street of any town or city, or a glance at any newspaper in this coun-

try will reveal the truth of this statement. The influence of the relatively small number of high-class men in optometry is not too great, unfortunately, for the public. It will be a long time before the right to being called an "ethical profession" is earned, and that day will not come until optometrists are held to be legally liable by the courts of the land for their mistakes in diagnosis. If the optometrists are sincere in their desires to be professional instead of commercial men, let them voluntarily submit to the discipline of the court of malpractice. Let them stop calling themselves "eye doctors" or "eye sight specialists" and let them acquaint the public with their true function, which is chiefly refraction and not pseudoscientific misleading methods of "treatment" and "exercises" for diseased ocular conditions which they are not yet, as a group, qualified to recognize nor legally privileged to treat.

Derrick Vail.

## CORRESPONDENCE

### THE USE OF THE METRIC SYSTEM IN OPHTHALMOLOGY

Editor,

American Journal of Ophthalmology:

Science has everywhere adopted the metric system. The change-over has been made in most scientific laboratories and hospitals. However, ophthalmology, since adopting the dioptric (metric) system, has been playing about with the metric and other systems. Articles, to this day, will mention one medicine dosage in the metric system and follow immediately with a dosage in the old apothecary system. In the same paragraph one measurement will be in millimeters and the next measurement in the linear. Responsible surgeons will speak scientifically of the strength of a lens using a meter for measurement and will then say "the vision is 20/20." In a recent article written by a man introducing a new method of ob-



serving the eye, the report is given as follows: "Vision of the left eye was the ability to count at two feet, which was improved 20/50 with glasses." A later sentence reads: "Tension in each eye 13 mm. Hg." This duplicity of systems is unscientific. Are we children that we cannot use the metric system of measurements in our scientific articles?

Seventeen years ago, in the midst of the British system (apothecary) and various other systems, our Central Province India Christian Mission Hospital adopted the use of the metric system exclusively. It has been in use there ever since. It seems logical that the American Journal of Ophthalmology should require that in articles published by them, the metric system be used for measurements of every kind. There is one exception—the taking of temperatures. This is still a nonmetric job in the English-speaking countries, but this change, too, could easily be made.

As ophthalmologists—who led in accepting the dioptric (metric) system many years previous to the acceptance of the metric system by even the laboratories of the English-speaking world—would it not be well to lead in complete acceptance of the metric system? At least let us relegate to the past the use of "feet" in measurements and say "6/6" instead of "20/20." We are a scientific people.

(Signed) Victor C. Rambo,  
110 Harvey Street,  
Philadelphia 44.

#### RECURRENT EROSION OF THE CORNEA

Editor,

American Journal of Ophthalmology:

In the treatment of the herpetic corneal lesion known as "Recurrent erosion of the cornea" or "bullous keratitis" (would not "Recurrent bulla of the cornea" be a better name?), the problem always is to prevent recurrence of corneal bullae during

the process of healing. Most ophthalmologists try to remove all the loose corneal epithelium, which may involve practically all the epithelium to within a very short distance of the limbus. They then usually scrub the exposed underlying stroma with some chemical irritant or escharotic in the expectation that the regenerating epithelium will form a firm adhesion to the underlying tissue. That success is by no means certain after one such treatment is attested by the considerable number of chemicals which are used for this application; those most commonly employed are iodine, phenol, and acetic acid in varying strengths and in various compounds and chemical modifications.

I believe iodine is the substance used most generally. In my experience, the ordinary U.S.P. tincture of iodine is not too satisfactory, because this preparation now officially contains a certain amount of potassium iodide, which makes it miscible with water. I prefer tincture of iodine made simply by dissolving iodine in alcohol; it is now non-official and precipitates when in contact with water. Therefore, when this preparation is applied to the anesthetized cornea, a brown deposit of iodine is precipitated; corneal epithelial regeneration is slower, the adhesion to the underlying stroma is firmer, and the tendency to recurrence is diminished. A solution of cocaine dropped on the cornea after the application of the iodine will arrest the further penetration of the iodine into the tissue if this seems desirable.

In cases wherein bullae recur after this treatment, I have always been able to secure a cure with the application of freshly prepared 1-percent aqueous solution of formaldehyde. Although with this product there is a greater tendency to corneal opacification, nevertheless it is well to have in reserve a form of treatment which can be used when one is more or less desperate. It seems superfluous to men-

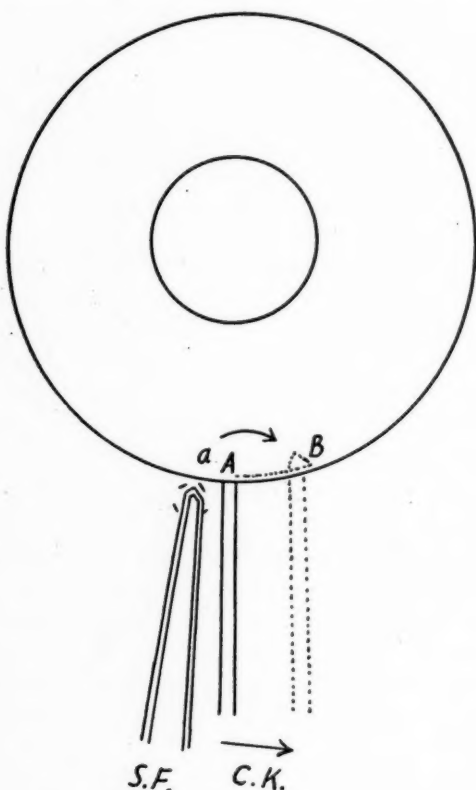
tion that after curetting the cornea and scrubbing, a tight dressing should be left in place for three to five days.

(Signed) Guernsey Frey,  
121 East Sixtieth Street,  
New York 22.

#### CORNEAL SECTIONS IN SOFT EYES

Editor,  
American Journal of Ophthalmology:

In a recent case presentation appearing under Society Proceedings in the Ameri-



S.F., Scleral fixation. C.K., Cataract knife. A, Point of entry into anterior chamber. B, Termination of incision. Arrows indicate direction of incision.

can Journal of Ophthalmology, a contributor stated that he had experienced difficulty when making a keratome incision into a soft eye during a combined

cyclodialysis and iridectomy for the relief of glaucoma.

It has been my experience that the keratome is usually a poor instrument for this particular maneuver. If fixation is taken at 180 degrees from the point of entry into the anterior chamber, there is considerable distortion of the soft eye, which is caught between the pressure and counterpressure of the fixation and the keratome. If fixation is taken near the point of entry the traction upon the posterior lip of the incision is usually sufficient first to interfere with the production of a good section, and further to pull the plug on the remaining aqueous, thus making doubly sure that the keratome is going to run afoul of either the iris, the cornea, or the lens.

The following procedure is suggested in entering the anterior chamber of a soft eye, particularly if it has undergone surgical or traumatic perforation:

Scleral fixation is taken close to the limbus and adjacent to the point where entry into the anterior chamber is to be made. With a cataract knife the anterior chamber is entered immediately alongside the fixation. The cutting edge of the knife faces away from the fixation. When the point of the knife is just visible in the anterior chamber, an incision along the limbus is made—away from the point of fixation. The incision should not be carried past the point where its lips begin to buckle away from one another. If it is desired further to enlarge the incision this should be done with the Stephens or other corneal scissors.

This incision does not distort the eye. Surprisingly little aqueous is lost while it is being made. The chances of impaling the iris are negligible when compared with those inherent in the keratome incision.

(Signed) H. E. Allen,  
Metropolitan Building,  
Columbia, Missouri.

# ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

## CLASSIFICATION

- |  |  |
|--|--|
| 1. General methods of diagnosis                        | 10. Retina and vitreous                                |
| 2. Therapeutics and operations                         | 11. Optic nerve and toxic amblyopias                   |
| 3. Physiologic optics, refraction, and color vision    | 12. Visual tracts and centers                          |
| 4. Ocular movements                                    | 13. Eyeball and orbit                                  |
| 5. Conjunctiva   | 14. Eyelids and lacrimal apparatus                     |
| 6. Cornea and sclera                                   | 15. Tumors   |
| 7. Uveal tract, sympathetic disease, and aqueous humor | 16. Injuries   |
| 8. Glaucoma and ocular tension                         | 17. Systemic diseases and parasites                    |
| 9. Crystalline lens                                    | 18. Hygiene, sociology, education, and history         |
|  | 19. Anatomy, embryology, and comparative ophthalmology |

### 1

#### GENERAL METHODS OF DIAGNOSIS

Gipner, J. **The interpretation of visual fields in neurotic patients.** New York State Jour. Med., 1945, v. 45, June 1, p. 1203.

Perimetric fields simulating field defects of organic disease in patients with functional disorders are often inaccurate in some details. They tend to change irregularly, and disappear with the cure of the patient. The perimetrist must carefully avoid suggestion when charting the field of vision in neurotic patients, so as not to transfer his preconceived ideas of the possible field to the suggestible patient. On the other hand, the examiner must keep an open mind in examining neurotic patients, so as not to miss perimetric signs of organic disease.

Theodore M. Shapira.

Miao, Tien-Yung. **An ophthalmic slide rule.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 80.

An ophthalmic slide rule for calculating or checking the following essential

measurements in ophthalmology is described: interpupillary distance, near point of convergence, binocular paralactic angle, angle of convergence, accommodating power in relation to age of patient, accommodation in diopters, visual field in degrees at working distances of 100 cm. and 75 cm., conversion of prism diopters into degrees, measurement of lens diopters, determination of meter angles. The rule is shown in diagrams and detailed instructions for its use are given.

Edna M. Reynolds.

Michaelson, I. C. **A simple device for testing diplopia.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 376-378.

A device which fits into the Hamblin ophthalmoscope handle is described and photographs are presented. The device is a tube closed at the top and having its posterior wall cut away. The anterior wall is perforated in the shape of an arrow. A 10-inch string is fixed to the top of the tube, marked off in inches and weighted at its free end.

The distance between the false and

the true images can be found by asking the patient to touch the arrow and then point to the false image. By means of the string, the surgeon measures the distance between the arrow and the patient's finger. Inch-spaced pieces of metal on the string make it possible in the dark to measure the separation. The degree of tilting of the false image can be found by tilting the handle of the lamp until the false image is erect and then noticing by touch the angle between the handle and the dependent string. (2 figures.)

Edna M. Reynolds.

## 2

### THERAPEUTICS AND OPERATIONS

Cameron, A. J. **Penicillin in ophthalmic therapeutics.** *Brit. Med. Jour.*, 1945, Feb. 17, p. 222.

The author has investigated as to whether the activity of penicillin is in any way affected by simultaneous use of other drugs commonly employed in ophthalmology. Adrenalin was the only drug which inactivated the penicillin, but neither cocaine, decicaine, atropine, eserine, argyrol, nor fluorescein had any inhibitory influence on penicillin.

R. Grunfeld.

Filatov, V. P. **Tissue therapy in military medicine.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 6.

Tissue therapy, introduced by Filatov in 1933 and the subject of over one hundred papers by him and co-workers, is reviewed with particular reference to eye diseases. Its principle is the utilization of "biogenic stimulators" (developed in tissues surviving in an unfavorable environment) for promotion of processes of absorption and regeneration. At first only homoplastic preserved and surviving tissue was employed for transplantation. Later auto-

plastic and heterogenic tissue was also used. Still later tissue fluids, and extracts from plants, preserved in darkness to create an unfavorable environment, have been experimented with. While the notion of the "biogenic stimulators" is only a working hypothesis and their chemical nature not yet ascertained, biologic tests in the form of curative effects, of effects on growth of tissue cultures, and on tissue regeneration establish their presence. Tissues are preserved for seven days at a temperature of three degrees above freezing. Leaves of plants are kept for 15 to 20 days in darkness, at a low temperature.

Tissue therapy has been employed at the front by Filatov with excellent results in four groups of eye diseases: keratitis, uveitis, optic atrophy, and trachomatous pannus. The results are illustrated by brief references to cases. In particular, tissue therapy, in the form of placental implantation and injections of placental extract, is regularly used as an adjuvant in corneal transplantations, to forestall complications and clouding of the transplant. Further details in regard to applications of tissue therapy and case reports are to be found in the publications of the Ukrainian Institute of Experimental Ophthalmology and in *Viestnik Oftalmologii*, as well as in nonophthalmologic journals. M. Davidson.

Keyes, J. E. L. **Penicillin in ophthalmology.** *Sec. on Ophth. Amer. Med. Assoc.*, 1944. 94th mtg., pp. 48-64. (See *Amer. Jour. Ophth.*, 1945, v. 28, Sept., p. 926.)

Weiss, C., and Shevky, M. **Clinical bacteriology and cytology of some ocular infections.** *Amer. Jour. Clin. Path.*, 1944, v. 14, Nov., p. 567.



The author presents bacteriologic and cytologic findings in 136 cases of acute and chronic infections of the eye. The report also covers the flora of the normal eye, and observations on three types of virus infection. A case of orbital infection due to *Torula histolytica* (*cryptococcus hominis*) is described which is the second of its kind in the literature. The results of routine bacteriologic and serologic examination in ocular infections may serve the ophthalmologist as a guide in the choice of the most suitable sulfonamide, or in the selection of other types of specific treatment, or as an aid in the prognosis or the epidemiologic management of a case. In order to prevent serious post-operative infection, the author would culture the conjunctiva in every patient who is about to have an intraocular operation. Theodore M. Shapira.

## 3

PHYSIOLOGIC OPTICS, REFRACTION,  
AND COLOR VISION

Kamellin, Samuel. **Catmin lenses.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 993-998. (2 figures.)

Simonson, E., Blankstein, S., and Carey, E. **The efficiency of the glare reduction by the eyelids.** Amer. Jour. Physiology, 1945, v. 143, no. 4, p. 541.

Light and dark adaptation were used to measure the coefficient of light penetration through the eyelids, after exposure times varying from 2 to 300 seconds. Only approximately 1 per cent of physiologically effective light calculated from light adaptation, and 0.6 per cent calculated from dark adaptation, penetrates the eyelids. The values in three well-trained subjects were similar, in spite of considerable individual differences in the speed of light and dark adaptation.

The high efficiency of the protection against glare is probably to a large extent due to a change of spectral distribution during passage through the eyelids. Theodore M. Shapira.

## 4

## OCULAR MOVEMENTS

Giardulli, Antonio. **Diabetic ophthalmoplegias.** Rev. Brasileira de Oft., 1945, v. 3, June, pp. 211-213.

A man of 59 years complained of diplopia of twenty days duration. Movement of the right eye was diminished in the sphere of action of the internal rectus. A few days later complete ptosis of the upper lid of the same eye developed. Laboratory tests were negative except as to excessive glycosuria. The muscular disturbance disappeared after five months on systemic treatment. Relapse occurred a month later, perhaps as a result of dietetic neglect, but the ocular symptoms again disappeared after twenty days.

W. H. Crisp.

Michaelson, I. C. **A simple device for testing diplopia.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 376-378. (See Section 1, General methods of diagnosis.)

Ramsay, A. M. **An analogy between eye strain (asthenopia) and heart strain (angina).** Glasgow Med. Jour., 1945, v. 143, April, p. 109.

An analogy exists between the function and innervation of the heart and of intrinsic eye muscles. Both are involuntary muscles and act as contractors as well as dilators. In each case innervation is by means of a double nerve supply, from the parasympathetic which controls contraction and the sympathetic which controls dilatation. Upon the maintenance of perfect sympathetic-parasympathetic balance de-

pend the smooth normal functioning. Disturbance of the equilibrium may be considered as the first sign of approaching disease. R. Grunfeld.

Robinson, J. S. **Summary of reexamination of orthoptic patients with consideration of permanence of results.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 999-1007.

## 5

### CONJUNCTIVA

Bland, J. O. W., and Wilson, R. P. **Bacteriologic and clinical observations on the treatment of the acute ophthalmias of Egypt with sulfonamides and penicillin.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 339-355.

In the experiments reported, no attempt was made to maintain an adequate concentration of the sulfonamide compounds in the blood. Attention was focused on the bacteriologic effects of the drug in relation to the conjunctiva rather than on any particular blood level. To reduce treatment to its utmost simplicity, only two doses of the sulfonamides were given in 24 hours. A table is given basing dosage on age rather than on body weight. To follow the bacteriologic progress of the case, smears from the conjunctival discharge were examined before treatment commenced and at regular intervals thereafter. A single dose of sulfapyridine cured a considerable proportion of gonococcus cases, but Koch-Weeks cases were more resistant. Two doses of sulfapyridine were not noticeably more effective than a single dose. Two doses of sulfathiazole at 8-hour intervals in one day cured almost all gonococcus cases but not all Koch-Weeks cases. Two doses of sulfathiazole on two successive days cured all cases of gonococcus and Koch-Weeks ophthal-

mia with very rare exceptions. A single intramuscular dose of penicillin resulted in negative smears in three to four hours, but relapses occurred unless a lasting cure was insured by repeated doses at short intervals. Penicillin had no effect on Koch-Weeks cases and is therefore thought unsuitable for acute Egyptian ophthalmia. (5 tables, references.) Edna M. Reynolds.

Burnet, E., Cuénod, A., and Nataf, R. **Treatment of trachoma by an azo-sulfonamide (G.33).** Presse Méd., 1941, July 16-19, pp. 763-765.

This sulfonamide, the sodium or potassium salt of parasulfamidophenyl-azosalicylic acid, synthesized in 1936 by French workers, is reported to be both efficacious and of low toxicity in trachoma. The authors used a dosage of 3 grams per day for periods of from two to three weeks and, if necessary, repeated the course after a rest period. Up to 300 grams were given without toxic signs. Of 300 cases treated only 12 had an erythema of mild degree and one a pruritus. A minor drop in white cells, particularly neutrophils, sometimes occurred but no actual case of leukopenia developed. The drug was efficacious in trachoma, improvement being obtained in all treated cases. Of 23 cases studied completely, certain healing occurred in 18. Rapid cure of secondary infections due to Koch-Weeks bacilli and to the diplobacilli of Morax-Axenfeld was noted.

Phillips Thygeson.

Darius, D. J. **Penicillin treatment of trachoma.** Amer. Jour. Ophth., 1945, v. 28, Sept., 1007-1009. (References.)

Mescheriakova, A. V. **Oculoglandular tularemia.** Viestnik Oft., 1943, v. 22, pt. 5, p. 45.

Three cases of oculoglandular tularemia are reported and their identical clinical picture is summarized as follows: an acute febrile onset, marked chemosis of lids, small ulcers on palpebral and ocular conjunctivas with clean floors, dilatation of lymphatic vessels which appear about the fourth week, scanty secretion, positive tularin test, and a preauricular bubo followed in four to six days by cervical and submaxillary glandular enlargement.

M. Davidson.

Pavlov, N. M. **The combined mechanochemotherapy of trachoma.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 32.

The combination of expression and chemotherapy has been found to result in a considerably greater percentage of cures of trachoma III than either method used alone, on the basis of 104 cases treated by the combination. The average hospitalization of the cases was 48 days. The chemotherapeutic agent is massage with a salve of brilliant green 0.025, copper citrate 0.2, white streptocide 0.2, vaseline 10, for ten days daily between expressions, and followed by a rest of six to ten days. Use of two or three such courses of treatment resulted in curing 76 per cent of the cases in the course of 1 to 1½ months. The milder cases got well under the use of massage with salve alone.

M. Davidson.

Pavlov, N. M. **The use of endemic indices in the epidemiology of trachoma.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 29.

Use of the trachoma-rate alone is not sufficient in formulating plans for an adequate antitrachoma campaign. While the growth of the focus is indicated by increase in the trachoma-I rate, its reduction is indicated by increase of the trachoma-IV rate. The

trachoma progress-index may be expressed by the formula: Tr. I/Tr. II plus Tr. III. The trachoma regression-index is expressed by the formula: Tr. IV/Tr. I plus Tr. II plus Tr. III. The index of activity of the focus is expressed by the difference between the first and second indices, which may be positive or negative. The intensity index is obtained by the relation between the number of serious cases and the total number of trachomas, multiplied by one hundred. The surgical index is valuable and is given by the relation of the number of cases requiring surgery to the total number of trachoma cases, multiplied by one hundred. Different measures are indicated by the latter two indices in the campaign. Foci studied showed an intensity index varying between 0.1 and 15.6; and a surgical index varying between 0.1 and 10.3.

M. Davidson.

## 6

### CORNEA AND SCLERA

Aynsley, T. R. **The use of insulin in the treatment of corneal ulcers.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 361-363.

Five cases of corneal ulcer are reported in which treatment with insulin gave rapid healing. It was used either locally as drops or by injection. Recently the author has confined the insulin treatment to injection of five units daily. Three possibilities are considered by the author. Insulin either improves the patient's nutrition, or removes some factor necessary for germ-metabolism, or increases the rate of epithelial proliferation.

Edna M. Reynolds.

Camino P., Carlos. **Operation of corneal transplant.** *Arch. Chilenos de Oft.*, 1944, v. 1. Nov.-Dec., pp. 13-19.

With minor variations, the author has followed the teaching of Castroviejo. He records five cases. One patient developed glaucoma secondary to pupillary ulcers which had existed before the corneal operation. For the glaucoma an iridectomy was undertaken, and this was followed by total hyphema and further hypertension, so that vision of 2/20 which had existed two months after the corneal operation was lost by opacification of the implant.

The second case was unsuitable for corneal operation, being complicated by extensive vascularization, secondary glaucoma, and cataract. In the third case it was impossible to obtain adequate mydriasis with atropine, and the iris adhered to the margin of the implant. Because of this difficulty in producing mydriasis, the author's last two operations were performed under maximal miosis, and were successful. In one of these, the vision after two years was 5/10; in the second, practically useful vision of 5/40 was obtained in spite of the presence of a lens opacity. (3 figures.) W. H. Crisp.

Chan, Eugene. **Blue sclerotics associated with bony defects in the nose.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 55.

A case of blue sclerotics in a Chinese girl aged 18 years is reported. The familial history was insignificant. There was no history of blue sclerotics or fragile bones in the family. There was no consanguinity. The girl's scleras had been blue since birth and she had had two fractures, one of the elbow eight years previously and one of the knee three years previously. Physical findings were negative except for the light blue scleras, protrusion of the left eye-

ball, and a large tumor mass in the left side of the nose. Biomicroscopy of the eyes showed definite thinning of the corneas. Biochemical analysis showed a definite increase in blood calcium.

The tumor mass in the nose was a giant-cell tumor which had invaded the ethmoid and sphenoid sinuses. After removal of the tumor, the patient developed secondary anemia. The left eye remained proptosed and was enucleated when the vision dropped to hand movements. The cornea was found to be only three fourths as thick as that of a normal eye. Stained sections of the sclera showed a decrease in the number of fibers but no change in their size. The sclera was one third to two thirds as thick as normal. Biochemical determinations of calcium in the sclera showed almost ten times as much calcium present as is normally found.

A summary of the literature is given and theories as to the cause of blue sclerotics are discussed. In view of the osseous lesions in the nose and the preponderantly high values of calcium in the sclera in this case, overactivity of the parathyroid glands is suggested as an etiologic factor. (References.)

Edna M. Reynolds.

Lee, F. M. **Scleral abscess.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 60.

Two cases of scleral abscess are reported, both of which developed after operative interference. One was in a boy, aged eight years, on whom bilateral optical iridectomy was performed. He was entirely uncoöperative and removed the dressings after the operation. One eye became infected and a scleral abscess 3 by 3 mm. formed. This was incised and 0.5 c.c. of greenish pus was evacuated. Cultures showed streptococcus viridans. The



wound healed but the eye subsequently became phthisic. The fellow eye remained unaffected.

The second case of scleral abscess occurred in a man aged 30 years on whom a bilateral iridectomy was done. One month after operation a deep abscess appeared in the right eye close to the limbus. Following incision and curettement, the wound healed well and the end result was good.

There is discussion of metastatic and traumatic scleral abscess, with a review of the literature. (References.)

Edna M. Reynolds.

Mao, W. S. **Keratoconus.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 90.

A case of unilateral keratoconus associated with trachoma III is reported. The patient was a male aged 37 years, who gave a history of recurrent attacks of ocular inflammation over a period of six years. Twenty days after the onset of the first attack, a white spot appeared in the center of the right cornea. Vision in this eye became gradually reduced to light perception, the cornea gradually bulged, and the eye turned in. Vision had never been good in the left eye but this eye showed no bulging of the cornea. The family history suggested that the patient's maternal uncle might have had a unilateral keratoconus.

Ophthalmologic examination revealed bilateral trachoma III. In addition, the right eye had convergent strabismus of 35 degrees and keratoconus. The left eye showed nebulae of the cornea but no keratoconus. Visual acuity was: right, light perception; left, 3/60, improved to 6/30 with -1.25 sphere. Tension was normal in each eye. The cone of the right cornea was located somewhat inferiorly and nasally. The cen-

tral part of the cornea was densely white.

Biomicroscopy showed a Fleischer ring and irregular superficial linear scars at the apex of the cone. Whitish-gray striae were present in large numbers, deep in the stroma, and there was increased visibility of the nerve fibers. The general physical examination was negative except for a strongly positive Kahn test. The patient was well built and well nourished.

Keratoconus is a very rare disease in China, only two cases being reported to date. (References.)

Edna M. Reynolds.

Pinticart de W. Elcira. **On the use of vitamin B<sub>2</sub> (riboflavine) in two cases of hereditary parenchymatous keratitis.** Arch. Chilenos de Oft., 1944, v. 1, Nov.-Dec., pp. 21-23.

In two patients aged 14 and 15 years respectively, daily treatment with riboflavine was thought to be responsible for improvement which occurred after 29 and 20 days of treatment respectively.

W. H. Crisp.

Rodigina, A. M. **Local application of sulfidine (sulfapyridine) in ulcus serpens.** Viestnik Oft., 1943, v. 22, pt. 5, p. 17.

Excellent results are reported from use of a 2-percent ointment in 26 cases, with 50 percent of the cases complicated by the presence of trachoma. In 96 percent of the cases the infection followed minor injuries of the cornea. In 22 of the cases a virulent strain of pneumococci, as established by inoculation of guinea pigs, was present, alone or in association with other microorganisms. The process has been seen to stop quickly. No perforation occurred, and better visual acuity was

secured than would have been otherwise obtained. The only complication noted was a mild transitory secondary iritis after the corneal process had stopped, and attributable either to liberation of toxins from the killed pneumococci or to direct action by penetration of the drug into the anterior chamber.

M. Davidson.

Sun, K. S. **Tuberculoma of the sclera.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 67.

A case of tuberculoma of the sclera in a patient 22 years old is reported. Four months prior to hospital admission, the patient gave birth to a child. A few days after delivery there was lachrimation and redness of the left eye. A month before hospital admission the vision of the left eye became markedly impaired. There was no history suggestive of tuberculosis in the family. Examination of the eyes showed the right one to be normal. The left eye showed elevation and congestion of the bulbar conjunctiva on the temporal side and there was adhesion to the underlying sclera, which showed in this region a bulging mass measuring 2 by 10 by 10 mm. The cornea showed generalized haziness. There was no vascular infiltration. The fundus could not be seen.

Fluoroscopy showed a tuberculous process in the left lung. The sedimentation rate was 57 percent and the intradermal tuberculin test was strongly positive in a 1 to 1,000 dilution. Biopsy of the tumor showed many typical tubercles. At the time of admission there was no adenopathy, but forty days after admission one preauricular lymph node on the left side was found enlarged. This was removed and showed the presence of many caseous areas and characteristic tubercles. A

review of the literature shows only seven other reported cases of tuberculoma of the sclera. (References.)

Edna M. Reynolds.

Svatikova, A. G., Chaikovskii, V. K., and Genne, M. P. **The treatment of keratitis with amnion preparations.** Viestnik Oft., 1943, v. 22, pt. 5, p. 25.

Amnion preparations used experimentally on rabbit cornea were found to hasten the epithelization of corneal wounds and to achieve it  $1\frac{1}{2}$  to 2 times as fast as in controls. An ointment of amniotic lipoids has been used with excellent results in a variety of cases of keratitis. Subjective improvement is noted in one to two days.

M. Davidson.

## 7

### UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Barrenechea, S., and Contardo, R. **Two cases of uveitis associated with alopecia, vitiligo, dysacusia, and poliosis (syndrome of Vogt-Koyanagi).** Arch. Chilenos de Oft., 1944, v. 1, Sept.-Oct., pp. 5-10A.

The two cases described occurred in women of 44 and 26 years respectively. In the older patient the poliosis appeared shortly after loss of the hair of the head, appearing in the new hair and in the existing hair, including the outer third of the eyelashes. In this patient the macula was involved and the final vision recorded for the right eye was counting fingers at one meter and for the left eye 0.2. In the second patient the final vision recorded was 0.4 for each eye with correction. In each case roentgenography of the teeth disclosed apical abscess of one or more teeth. Treatment with tuberculin was tried in one case, but without effect.

One of the patients later underwent cataract extraction without complication. (References.) W. H. Crisp.

Brucher Encina, Rene. **Metastatic endophthalmitis treated with penicillin.** Arch. Chilenos de Oft., 1944, v. 1, Sept.-Oct., pp. 15-16.

The patient, a woman of 27 years, was hospitalized for septic abortion at three months pregnancy. In spite of the use of sulfathiazole, a violent endophthalmitis developed, with a mass behind the pupil. Light perception was lost. Two weeks after intramuscular treatment with penicillin, vision of 0.4 had been recovered, and vision further improved to 0.8. W. H. Crisp.

Schultz, Abraham. **Boeck's sarcoid with uveoparotitis and dacryoadenitis.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 1010-1014. (4 figures, references.)

Shershevskaya, O. I., and Kopilevina, Z. A. **Pupillary disturbances in craniocerebral trauma.** Viestnik Oft., 1943, v. 22, pt. 6, p. 14.

A case of Adie's pupillotonia is described in connection with a cerebral contusion to which it was attributed.

M. Davidson.

## 8

### GLAUCOMA AND OCULAR TENSION

Awerbach, M. I., and Ivanova, E. M. **Cyclodiathermy in glaucoma.** Viestnik Oft., 1943, v. 22, pt. 5, p. 3.

In 1940 Vogt's cyclodiathermy was introduced in the Helmholtz Central Ophthalmic Institute of Moscow, and 52 operations have been performed since. Only one fourth of the ciliary body is subjected to punctures, so as to provide for repetition of the operation when necessary. The operation has been found simple and safe. The

best results have been achieved in aphakic eyes, in eyes with total leucomata, in traumatic glaucoma, and in congenital subluxation of the lens. In cases of sympathetic uveitis, after brief hypotony there was noted a short spell of increased tension, which later subsided. The operation was found to facilitate deepening of the anterior chamber for later antiglaucomatous operations, and also for extraction of cataract. In only two cases was there hypotony lasting as long as two or three weeks. In one case the operation on one eye was also followed by lowered tension in the other. The results are most permanent in secondary glaucoma. They are believed due to the temporary drainage, with subsequent permanent ciliary-body atrophy and hyposcretion. M. Davidson.

Paulo, A., Jr., and Arruda, J. de. **Comments regarding one hundred glaucoma observations.** Rev. Brasileira de Oft., 1945, v. 3, June, pp. 201-206.

In a brief article, the author warns against resorting to operation in any case in which, even if the condition is acute, it is possible to control the intraocular tension with miotics. For absolute glaucoma with pain, he resorts to retrobulbar injection of absolute alcohol. W. H. Crisp.

Rones, Benjamin. **The relationship of German measles during pregnancy to congenital ocular defects.** Med. Annals District of Columbia, 1944, v. 12, Aug., p. 285. (See Section 9, Crystalline lens.)

Sverdlov, D. G. **Changes in the scleral and corneal nerves in absolute glaucoma.** Viestnik Oft., 1943, v. 22, pt. 6, p. 32.

Pathologic studies of five glauco-

matous eyes and five dog eyes were compared with study of two otherwise healthy human eyes enucleated because of injuries. A peculiarity of the normal scleral nerves is that after entering the sclera with the vessels they divide into medullated and nonmedullated branches which not only follow closely the scleral fibers but remain in the same interlamellar space. In glaucoma they were found to have proliferated to a great extent and to have thicker branches. There were also thickenings in their course, which occasionally appeared as a spiral similar to that observed in regeneration of sectioned nerves, or in general to the formations found in neuromata. The corneal nerves on the other hand exhibited forms of degeneration rather than of regeneration. On the basis of the nerves not ending in cells and of their following the scleral fibers, the function of the scleral nerves is considered not as trophic or centrifugal but as centripetal tension-receptors, that is conducting the stimuli of contraction and relaxation of the scleral fibers. Such tension enteroceptors have been described in the diaphragm, meninges, bladder, stomach, and intestines. When such receptors are irritated they proliferate and, as in true neuromata, register pain, although normally not pain receptors. Whether the findings represent a primary process or a secondary phenomenon the result of hypertension is at present not clear. M. Davidson.

## 9

## CRYSTALLINE LENS

Bhat, P. K. **Hypotony following cataract extraction.** The Antiseptic, 1945, v. 42, Jan., p. 45.

After an intracapsular cataract extraction with peripheral iridectomy the

wound healed perfectly within ten days and no complication occurred. Eleven days later the aphakic eye showed hypotony with ciliary injection, haziness of the cornea, and striate keratitis. The cataract wound margins were quite in apposition and no filtration was present. The author attributes the hypotony to ophthalmomalacia or essential phthisis. R. Grunfeld.

Espildora-Luque, C., O'Reilly, G., and Manns, E. **Ultrarapid opacification and spontaneous reabsorption of the lens.** Arch. Chilenos de Oft., 1944, v. 1, July-Aug., pp. 12-17.

A man aged 23 years had lost the left eye in an accident years previously. Three days before visiting the clinic the vision of the right eye had become cloudy, the disturbance being accompanied by severe ocular and periorbital pain. Before the change, the vision of this eye had been 2/3 with minus 11.00 D. sphere. The left eye showed extensive iridodialysis and complicated cataract, with poor light perception and projection. The right eye was intensely injected and had a complete intumescent cataract. The tension was 23 mm. Schiötz. In the course of treatment, the aqueous humor, at first clear, began to show a great number of snowy flakes, and after a few days a horizontal fissure appeared in the center of the lens capsule, which became tremulous. The inflammatory reaction continued.

At this stage roentgenography of the teeth showed a filled upper premolar, on the side of the acutely involved eye, and containing a metallic filament which occupied the whole length of the central canal and even projected about 2 mm. beyond the apex of the tooth into the alveolus, but without any trace of inflammatory focus or bony lesion.



Two lower molars on the same side appeared suspicious of an apical inflammatory lesion. One hour after extraction of the premolar the patient had his last painful crisis. The lens flakes and the lens substance in general steadily became absorbed. Rather more than a month later the patient had normal vision of this eye with a plus spherical correction. W. H. Crisp.

Kamellin, Samuel. **Catmin lenses.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 993-998. (2 figures.)

Poppe, Erik. **Experimental investigations of the effects of roentgen rays on the epithelium of the crystalline lens.** Acta Radiologica, 1942, v. 23, no. 4, pp. 354-367.

In an experimental series 34 rabbits were irradiated with X ray. Each received 1,500 r in 45 minutes. Although in histologic preparations epithelial changes were observable 24 hours after irradiation, cataract became manifest clinically only after four months from the experimental irradiation. The opacities were seen in the region of the posterior pole, immediately in front of the posterior capsule. They consisted of numerous vacuoles and streaks, forming a disc-shaped or saucer-shaped opacity densest, as a rule, toward the periphery, and sharply demarcated anteriorly toward the clear remaining part of the cortex. Beneath the anterior lens capsule diffuse vacuoles and striae were seen but were less pronounced than posteriorly.

Radiation cataract develops because of pathologic alterations in lens epithelium, and consequent interference with the nutrition of the lens. From the fiber-forming epithelium, pathologic fibers grow in the equatorial region, spreading and disintegrating in

the subcapsular region of the cortex. This development explains the long latent period between irradiation and the clinical manifestation. (16 illustrations, references.) R. Grunfeld.

Rones, Benjamin. **The relationship of German measles during pregnancy to congenital ocular defects.** Med. Annals District of Columbia, 1944, v. 12, Aug., p. 285.

When in 1941 Gregg reported that in 78 cases of congenital cataract occurring in infants the mother had with a few exceptions had rubella in the early months of pregnancy, the State of South Australia sent out a committee to investigate the matter. The committee's conclusion is that if a woman contracts rubella in the first two months of pregnancy her chances of giving birth to a congenitally defective baby are in the neighborhood of 100 percent, whereas if she contracts rubella in the third month about 50 percent will be afflicted.

The author reviews his case histories of the last year. Three women had rubella and one had measles. In the two cases in which the exanthem occurred during the second month of pregnancy the infants developed cataract, while in the two cases in which the disturbance occurred in the third month of pregnancy the infants were afflicted with congenital glaucoma.

R. Grunfeld.

Rosen, Emanuel. **Traumatic lenticulus posterior.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 370-373. (See Section 16, Injuries.)

## 10

### RETINA AND VITREOUS

Bailliart, P. **The prognosis of arterial hypertension as judged from the ap-**

**pearance of the retina.** Presse Méd., 1944, Nov. 18, pp. 267-268.

Bailliart discusses in detail the various ophthalmoscopic signs which are of prognostic value in hypertension. Of these, edema of the papilla is the most serious. Even mild edema of the disc margins, particularly if bilateral, suggests a grave prognosis. Thrombosis of the central retinal vein in a hypertensive patient likewise implies a poor prognosis and when accompanied by a low retinal arterial pressure in both eyes is indicative of approaching serious cerebral complications. Another bad prognostic sign is a disturbance of the normal ration (1 to 0.45) between the brachial and the retinal arterial pressures in which the retinal pressure reaches or even surpasses the brachial. A correctly measured diastolic retinal pressure of 150 mm. Hg indicates, irrespective of the brachial pressure, an approaching breakdown of the cerebral circulation. Changes in the vessels themselves are considered of great value in determining prognosis and the various abnormalities are discussed in detail. The article concludes with a discussion of the nature of hypertension.

Phillips Thygeson.

Contardo A., R., and Peralta G., A. **Retinal venous thrombosis and its treatment by radiotherapy.** Arch. Chilenos de Oft., 1944, v. 1, July-Aug., pp. 22-41.

With a rather extensive review and summary of the literature of the subject, the authors associate a consideration of the action of radiation on the normal eyeball. They tabulate seven cases in which such treatment was used for retinal thrombosis, and they express the opinion that radiotherapy is indicated in every case of thrombosis produced by external pressure upon

the vessel with secondary formation of thrombus and with occlusion of the vessel walls by inflammatory affections. They would use anticoagulant preparations in the treatment of blood dyscrasias with formation of thrombus, and in occlusion due to thrombus from stagnation secondary to arterial spasm, supplementing such treatment with the use of vasodilators. (References.)

W. H. Crisp.

Espíldora Luque, C. **Concerning ophthalmoscopic classifications of arterial hypertension.** Arch. Chilenos de Oft., 1944, v. 1, Nov.-Dec., pp. 5-11.

In this short article, the author suggests that Wagener and Keith have made the mistake of believing that the ophthalmoscopic phase of hypertension was inseparably united to the general clinical phase of the disease! (References.)

Girault-Dangely, Y. **Antivitamin K and obliteration of the central artery of the retina.** Presse Méd., 1945, June 16, pp. 327-328.

Four young adults with closure of the central artery of the retina were treated with one of the antivitamin-K preparations, 3,3 methylene 4,4 dihydroxycoumarine (Dicoumarol), in 50-mg. tablets, a total of 15 being taken in 48 hours and the course repeated after an interval of one week if necessary. Except for an epistaxis in one hypertensive patient no complications ensued. An apparent therapeutic effect was noted in all four cases. Five additional patients with hypertension and arteriosclerosis, all over sixty years of age, were treated similarly without result. The author points out that the four young subjects had associated retinal disease which may have contributed to the vascular condition,

whereas the older subjects presented the classical picture of occlusion of the central artery. Phillips Thygeson.

Hart, J. L. **Quinine amblyopia with spontaneous detachment.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 375-376. (See Section 11, Optic nerve and toxic amblyopias.)

Kolen, A. A., and Shereshevskaja, G. M. **Pathogenesis of vitreous opacities and a new method of treating them.** Viestnik Oft., 1943, v. 22, pt. 5, p. 11.

While the etiology of vitreous opacities is in some cases known, as in high myopia, anemia, and injuries, their pathogenesis is not clear and is moreover not likely to be the same. Archangelsky in 1929, having secured definite results from blood transfusion, came to the conclusion that blood transfusion has colloidoclastic effect on the vitreous. Since 1933, Kolen's Novosibirsk Eye Clinic has been devoting itself to the study of affections of the vitreous and their treatment. The working hypothesis underlying the studies is that vitreous opacities are the result of penetration into it of excessive quantities of fluids from the blood, and that the conditions for such an excessive transfer are increased permeability of vessel wall and decreased blood coagulability. In most of the cases where no satisfactory etiologic factor could be isolated, thrombopenia and delayed retraction of coagulum were noted, and accompanying the positive effect on the vitreous opacities were noted an increase of thrombocytes and acceleration of coagulum retraction. Since the effect of blood transfusion is rather complex, the simpler thrombocytopoietic factor found in the duodenal juice by Shereshevskaja was utilized. This is secured from a healthy

donor and introduced by means of the duodenal catheter into the patient with vitreous opacities. The results are the same as from blood transfusion and serve to demonstrate the correctness of the hypothesis. Nine cases are tabulated to illustrate the thesis.

M. Davidson.

Kruglyi, A. **The dynamics of light-sense disturbances under repeated brief exposure to low barometric pressure.** Viestnik Oft., 1943, v. 22, pt. 5, p. 40.

By means of the radioactive adapter of Fedorov, especially suitable for experimental work with a pressure chamber, it was established that the lowered dark adaptation first noted at the 5,000-meter level disappeared in 10 days when the exposures were repeated every day or every second day, and then became practically normal. There is thus definite habituation to low pressures. (Illustrated.) M. Davidson.

Lucic, Hugo. **Juvenile disciform degeneration of the macula.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 965-979. (16 figures, references.)

Newson, A. L., and Armstrong, K. B. **A case of burns associated with bilateral retinitis.** Med. Jour. Australia, 1945, v. 1, May 5, p. 459. (See Section 16, Injuries.)

Riser, P., Becq, Couadau, and Lavitry. **Papilloretinitis in arterial hypertension.** Presse Méd., 1941, Oct. 1-4, pp. 1058-1062.

Many hypertensive patients develop neither papilloretinitis nor intracranial hypertension and show a tolerance of long duration to their disease. An important number of patients, however, develop, after a period of years, the picture of intracranial hypertension and

papilloretinitis, which carries a very poor prognosis. The authors have studied, both in experimental animals rendered hypertensive by adrenalin injections and in humans, the factors which lead to retinal and intracranial complications. Among those considered were (1) toxic factors, principally the retention of chlorides, (2) venous hypertension, (3) local cerebral lesions such as edema, hemorrhage, and serous arachnoiditis, and (4) local retinal vascular changes. There is a full discussion of each of these. In experimental hypertension as well as in permanent hypertension they found that the elevation of pressure in the temporal, retinal, and cerebral arteries was proportionately much greater than in the arteries of the extremities. The retinal and cerebral capillary bed is therefore subjected to a strain which is particularly great and which would obviously favor transudation. Edema of the disc is a phenomenon which may appear in the course of arterial hypertension; it may continue for some time without intracranial hypertension but usually does not do so. Conversely, intracranial hypertension may occur without retinal changes but such a situation is usually of short duration. It is concluded that a papilloretinitis represents the association in various proportions of all the factors making for malignant hypertension. Phillips Thygeson.

Riser, P., Couadau, and Géraud. **The prognostic value of papilloretinitis in arterial hypertension. Solitary papilloretinitis.** *Presse Méd.*, 1944, April 22, pp. 113-114.

In the great majority of cases a retinopathy or edematous or exudative papilloretinitis in a hypertensive individual is a sign of the most serious prognostic significance. Occasionally,

however, the sign regresses and the individual may survive over a period of years. Three such cases are reported, two of them still living after five years and one dead after seven years.

Phillips Thygeson.

Riser, P., Couadau, and Signeuric. **Carotid sinus and retinal circulation.** *Presse Méd.*, 1945, March 31, pp. 161-162.

In a study based on the simultaneous determination in fifty subjects of the minimal retinal arterial pressure and the humeral arterial pressure, the results of (1) digital compression of the carotid sinus region, (2) inhibition of the sinus by novocaine, and (3) compression of the carotids below the sinus, were investigated. Unilateral compression of the sinus region in old arteriosclerotic patients occasioned a fall of general arterial pressure, particularly the systolic, with bradycardia continuing for several seconds after the compression was relieved. The diastolic retinal arterial pressure underwent a simultaneous fall proportionate to that of the humeral pressure. The phenomenon was identical in the two eyes. In the return to normal the brachial pressure most often preceded the retinal. In two hyperreactive subjects it was possible by light compression, insufficient to interrupt the carotid flow, to produce syncope, at which time the retinal pressure fell to zero. Bilateral compression produced the same effect.

In three hypotensive unilateral subjects inhibition of the sinus was obtained by regional infiltration with novocaine. A marked rise in pressure lasting up to fifty minutes was noted in both upper extremities, and a 50-percent rise in diastolic retinal arterial pressure occurred and lasted at least eight minutes longer than the brachial



rise. Bilateral inhibition of the sinus produced the same effect except that the amplitude of the hypertension was increased.

Compression of the carotids below the sinus had a very decided hypertensive effect on the general circulation, lasting as long as the compression. On unilateral compression a drop in homolateral retinal arterial pressure was noted; this tended to rise after several minutes, while on the contralateral side a rise proportional to the general rise occurred and was maintained. Bilateral compression led to a considerable drop in retinal pressure without visible changes in the retinal arteries.

The authors stress the fact that important modifications of pressure may occur without visible change in the caliber of the retinal vessels. They conclude that the hypotensive effect of compression on the retinal arteries can be explained by a drop in blood volume and that the sinus had no action on the retinal circulation which was not shared by the general circulation.

Phillips Thygeson.

Weekers, Roger. **Retinal functions in the late concussion syndrome.** *Presse Méd.*, 1944, May 20, p. 150.

In the course of a systematic study of retinal functions in head-injury cases having a late concussion syndrome, a pathologic enlargement and increase in density of angioscotomata was noted. This finding, not before described, indicates an alteration in retinal circulation and is considered to be of value in the diagnosis and prognosis of the syndrome. Contraction of the isopters of the peripheral field is derived from the same cause but is apparent only in particularly severe cases. Systematic study of the peripheral, medial, and internal isopters also

gives valuable information as to the severity and progress of the condition. Reduction of central visual acuity is exceptional and occurs only in extremely severe cases in which enlargement of the angioscotomata involves the central portion of the retina. Dark adaptation of the macular and perimacular retina is normal except in severe cases in which visual acuity is reduced.

Phillips Thygeson.

## 11

### OPTIC NERVE AND TOXIC AMBLYOPIAS

Charlin C., Carlos. **Optic neuritis during lactation.** *Arch. Chilenos de Oft.*, 1944, v. 1, July-Aug., pp. 6-11.

After one month of lactation, a woman aged 27 years developed acute bilateral retrobulbar iritis. The vision two months later was reduced to right 1/50, left 1/40. There had been no ocular disturbance during pregnancy. Roentgenography of the chest showed fibrosis of the upper third of each lung. In the course of three months following childbirth the patient had lost seven pounds. According to her own statement, her visual trouble had begun after an intestinal infection with vomiting, diarrhea, and fever, but lasting only two days. Weaning was ordered and the vision and general condition began to improve. One year later the vision is said to have been normal.

W. H. Crisp.

Hart, J. L. **Quinine amblyopia with spontaneous detachment.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 375-376.

Severe quinine toxic amblyopia with spontaneous detachment and optic atrophy is described in a soldier aged 29 years. He had been ill with general malaise, headache, and anorexia for

three days. His temperature was 101° and pulse 105. A diagnosis of malaria was made because the spleen was enlarged. The quinine dosage is not specified. A blood slide was negative for malarial parasites. The temperature rose to 104° and the patient became mentally confused. The following day he became deaf and the pupils became dilated and fixed.

The temperature dropped to 98°+ but quinine was continued. On the third day, the temperature was still down, the patient remained confused, and the pupils remained dilated and fixed. Quinine was stopped and mepacrine was begun, and the patient transferred to a general hospital. Nine days after onset of his illness, fundus examination showed blurred disc margins in the right eye, with extremely small arteries, scarcely visible beyond the disc. The left eye showed pallor of the optic nerve and small arteries as in the right eye. Light perception was denied. Inhalation of amyl nitrate had no effect on the caliber of the vessels.

Two days later, the left retina was seen to be detached above the nerve head. No hole was made out. Thirteen days after onset of symptoms and commencement of quinine, the right eye counted fingers at 1 meter. The field was restricted to fixation and there was loss of color vision. The pupil was very sluggish and the disc was pale. The left eye could vaguely perceive light. The disc was paler than the right. The vessels and detachment were as before.

The possibility of a diagnosis of retrobulbar neuritis occurring in acute encephalitis is mentioned, but the history of quinine administration (probably 60 to 90 grs. in all), the deafness, the contracted fields, and the vascular changes favor the diagnosis of quinine amblyopia. Edna M. Reynolds.

Soto Romay, R., and Nogues, A. E. **Gravidic toxicosis with intracranial hypertension and optic neuritis. Therapeutic abortion.** *La Semana Méd.*, 1945, v. 52, May 10, pp. 805-810.

The picture of intracranial hypertension and optic neuritis, with marked reduction of visual acuity, appeared in the first half of pregnancy, in a woman of 25 years. Cure resulted from abortion provoked by intra-amniotic injection of formalin. (4 figures, references.)

W. H. Crisp.

Tang, Pei-Ching. **Retrobulbar neuritis in Chengtu.** *Chinese Med. Jour.*, 1945, v. 63A, Jan., p. 83.

A study of 52 cases of retrobulbar neuritis is reported. The etiology of this disease in China appears to be somewhat different from that in other countries. Not one of the cases studied in this group showed multiple sclerosis, which is certainly by far the most common cause of retrobulbar neuritis in the United States. Twenty-six cases or 19.2 percent were due primarily to infected tonsils. Maxillary sinusitis and ethmoiditis were causative factors in six cases. One case was due to tuberculosis, one to syphilis, one to dietary insufficiency, and one to dental infection. Etiologic factors remained obscure in the great majority of cases.

All the patients complained of impaired vision for both near and distance. Relative scotoma was present in 21 eyes. There were only three cases of positive scotoma. In 44 cases there was a history of gradual onset of symptoms in both eyes at the same time. Sudden onset of symptoms in both eyes occurred in five cases. Thirty-two eyes showed definite fundus changes (hyperemia or optic-nerve pallor). Four cases of long duration showed optic-nerve atrophy. Fundus

findings were normal in the remainder.

Out of 15 cases receiving fever therapy, seven showed definite improvement in vision. Ethmoidectomy was also followed by improvement in vision in several cases. (12 tables, references.)

Edna M. Reynolds.

Voisin, J., and Aurenche, A. **Optic neuritis in the course of leptospirosis icterohemorrhagica.** *Presse Méd.*, 1945, April 7, p. 174.

Uveitis and optic neuritis are well-recognized complications of this disease but the generally accepted view that they are always benign is not justified. The authors state that there are three forms of optic neuritis which can be recognized in routine fundus examination during the course of the disease. The most benign type is the most frequent, gives rise to no functional disturbance, and appears as a mild hyperemia and edema of the papilla with occasionally a slight exudate into the vitreous. In the second but less frequent type a typical optic neuritis occurs, with an appreciable drop in visual acuity and contraction of the visual fields; healing takes place within two or three months. The third type is relatively severe and shows marked modifications in the vessels leading to secondary optic atrophy with permanent field changes and lowered visual acuity. In some cases blindness has resulted. Severe complications are sufficiently frequent to warrant serious consideration. Phillips Thygeson.

## 12

### VISUAL TRACTS AND CENTERS

Figueiredo, P. N. de. **Again ocular symptoms of hysteria.** *Rev. Brasileira de Oft.*, 1945, v. 3, June, pp. 215-217.

An aeronautic mechanic 24 years of

age lost the vision of the right eye. He produced hemiptosis by lowering the left eyebrow. But, in the dark room, energetic manipulation and persuasion permitted sufficient examination to show that the left eye was normal. The patient made out that the eye had no vision in the normal position of the head yet could read 20/30 with the head inclined to the right and the eye half closed; but that with the head inclined to the same extent in the opposite direction the eye saw nothing except that the letter card was completely red. It appears that a cure was finally effected by means of convulsive shock.

W. H. Crisp.

Popov, M. Z. **The eye syndrome in the cerebral commotion-contusion syndrome.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 37.

Pure cerebral commotion is rare even in wartime because, while the explosion giving rise to it may occur 2 to 4 meters away, the soldier usually falls to the ground, and direct cerebral contusion results. Hence the term commotion-contusion syndrome is used. The eye findings within five to ten days among seventy soldiers were: vertical nystagmus, sluggish pupillary reaction, and complaints of diplopia, asthenopia, and photophobia. In the fundus were seen hyperemia of the nerve head, without blurring of the margin, and dilatation and abnormal tortuosity of the veins. Injury of the hypothalamus, as well as other mechanical and physiologic intracranial disturbances, is assumed. M. Davidson.

Rouquier, A. **Contraction of the visual field and amblyopia from head injuries.** *Presse Méd.*, 1945, Feb. 10, p. 71.

Concentric contraction of the visual

field without central scotoma is very frequent in cranial injuries. It is more often bilateral but is generally much more marked on the side of the lesion. Occasionally it is unilateral on the homolateral side. The amblyopia which frequently accompanies these changes is likewise more marked on the side of the lesion. It may appear several years after the traumatism, particularly in individuals carrying projectiles which are apparently well tolerated. It appears probable that the visual field changes and the amblyopia belong to the group of late reflex disturbances which includes such conditions as late contractures of limbs, and neurologic disturbances in amputation stumps. The medicolegal importance of this type of lesion, which must be sharply distinguished from psychoneurosis, is stressed.

Phillips Thygeson.

Weekers, Roger. **Retinal functions in the late concussion syndrome.** *Presse Méd.*, 1944, May, p. 150. (See Section 10, Retina and vitreous.)

Wybar, K. C. **Branch thrombosis of middle cerebral artery.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 355-360.

A case of thrombosis of the parieto-temporal branch of the left middle cerebral artery is reported. The patient, a woman aged sixty years, experienced a severe left-sided headache associated with a defect of the right side of each visual field and a tendency to make mistakes in the use of spoken words. During the previous five years, the patient had at various times been conscious of a smoky smell, associated with a dulling of taste sensibility. Her father and grandfather had both died of cerebral hemorrhage.

Physical examination revealed no abnormality apart from the eye condi-

tion. Blood pressure was 160/90 mm. Hg. Corrected vision was 6/24 in each eye. There were marked arteriosclerotic changes in the vessels but no hemorrhage or exudate was observed. The field of each eye was full except that in each eye there was a right superior homonymous quadrantic scotoma adjacent to the fixation point, the left scotoma larger than the right. This field defect persisted with slight fluctuations over a period of some months.

The pathologic process affected selected fibers of the ventral portion of the geniculocalcarine pathway, causing a permanent scotoma adjacent to the fixation point but not extending through the whole visual quadrant. In the early stages associated edema temporarily affected neighboring fibers. (1 table, fields, references.)

Edna M. Reynolds.

### 13

#### EYEBALL AND ORBIT

Chan, Eugene. **Actinomycosis of the orbit.** *Chinese Med. Jour.*, 1945, v. 63A, Jan., p. 98.

A male patient aged 58 years gave a history of a red, painful nodule of 5-years duration in the right lower lid. The nodule had ruptured, blood and pus draining into the nostril. Later the nodule increased in size again and the patient could not open the right eye. Ulceration then appeared on the skin of the lower lid. Smears of the discharge from the ulcerated lesion showed the presence of knots of mycelium with radially projecting tips. Excised tissue from the tumor appeared studded with many white and yellow dots. Microscopically, the tumor was made up of inflammatory tissue infiltrated with lymphocytes, leucocytes, and epithelioid and giant cells.



The patient disappeared, after three-weeks hospitalization, so that the case was not followed up. The literature is reviewed and the rarity of actinomycosis in China is mentioned. (References.)  
Edna M. Reynolds.

Dobyns, B. M. **The influence of thyroidectomy on the prominence of the eyes in the guinea pig and in man.** Surg., Gynec., and Obstet., 1945, v. 80, May, p. 526.

The author has devised an improved caliper-method and a camera-lucida technique for more accurate observation of the prominence of eyes in guinea pigs. Total thyroidectomy was performed on 13 guinea pigs. The author has observed 233 patients on whom subtotal thyroidectomy was performed. Increased prominence of the eyes was noted both in the experimental animals and in the patients. Among the patients correlation was detected between the fall in metabolic rate and the increase in prominence of the eyes. But neither the presence of thyroiditis, nor the weight of the thyroid tissue removed, nor the presence of preoperative exophthalmos, nor the presence of intraglandular hyperplasia had any correlation with the changes in prominence of the eyes in the patients on whom a subtotal thyroidectomy had been performed.

R. Grunfeld.

Eggers, Harry. **A new type of enucleation implant.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 1015-1017. (1 figure, 1 reference.)

McKay, E. D. **New technique in orbit reconstruction following radical surgery.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 1017-1018. (1 figure.)

Martini Z., Italo. **Intraorbital hydatid cyst.** Arch. Chilenos de Oft., 1944, v. 1, July-Aug., pp. 17-22.

A married woman of twenty years, without significant history as to general condition, developed severe pain in the right eye, accompanied by redness of the eye and gradual swelling toward the internal angle. In the course of a few months exophthalmos and conjunctival chemosis became extreme, although the pain diminished. X-ray pictures showed enlargement and deformity of the right orbit, but without destruction of the walls except in the region of the lamina papyracea. Sudden exacerbation demanded immediate action. Through an incision along the base of the lower lid, with exposure of the orbital wall, the cyst was penetrated with a needle at the point of greatest prominence, and 35 c.c. of transparent liquid was evacuated, the withdrawal being followed by injection of 8 c.c. of 2-percent formalin solution which was allowed to remain for five minutes in the cystic cavity. Collapse of the cyst upon withdrawal of this fluid would have rendered extraction of the membrane difficult, but the needle was allowed to remain in place, and served as a guide to incision into the cavity of the cyst. The internal wall was found lined with the germinative membrane, which had a "very characteristic" white hyalin appearance, and was separated quite easily from the surroundings. Floating in the flask of formalin solution the cyst was of the size of a small hen's egg. During the next few days the patient had a febrile reaction, a cloudy serous fluid escaped between the sutures, and the edema resulting from the operation and injection extended down the cheek and even to the neck, where some

swollen glands appeared. Complete closure of the wound occupied almost two months. The patient failed to return for further examination. As the most important foundation for successful operation in such a case the author emphasizes maintenance of contact with the cyst, a precaution which is impossible if the cyst is emptied by means of a simple puncture. The assistant should never abandon his hold on the needle or withdraw it. (1 photograph, 1 drawing.) W. H. Crisp.

Sverdlick, J., and Luis Fernández, L. **Orbital reconstruction by the Esser-Wheeler technique.** *La Semana Méd.*, 1945, v. 52, July 26, pp. 142-144.

The method here briefly reviewed is that of the use of a dental "stent," around which is wrapped a free transplant of skin of intermediate thickness, after complete removal of scar tissue down to the periosteum. (1 illustration, references.) W. H. Crisp.

#### 14

##### EYELIDS AND LACRIMAL APPARATUS

Florey, M. E., McFarlan, A. M., and Mann, I. **Report of 48 cases of marginal blepharitis treated with penicillin.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 333-338.

The bulk of the cases treated had reached a chronic stage, only five having a history of less than two months duration. All but seven cases were examined bacteriologically before treatment began. Thirty-nine showed staphylococcus aureus and two staphylococcus albus.

The treatment was carried out by the patients. Each was given a weekly supply of ointment containing 600 to 800 Oxford units per gram. Instructions were to keep the ointment covered

in a cool place, and to apply a small quantity of ointment to the lid margins with a wooden probe, rubbing it in with the latter. When possible, this treatment was carried out three times a day, and always before retiring.

The final criterion of recovery was complete disappearance of staphylococcus aureus from swab cultures. This was considered the safest insurance against relapse. All patients except one reported alleviation of symptoms. This was noticed by some within 24 hours, and by the end of a week 33 cases showed improvement.

Clinical recovery took place in 36 of the cases. Bacteriologic recovery was registered in 24 of these, some accident preventing final examination of the 12 others. In 11 cases, though alleviation of symptoms occurred, treatment was not carried through till they could be listed as fully recovered. No improvement was reported by one patient who had a refractive error and whose bacteriologic cultures showed the presence of staphylococcus albus only (coagulase negative.)

Three to six weeks time was required for recovery. Some infections recurred one or two weeks after cessation of treatment, even when this had been continued till after staphylococcus aureus had disappeared from the cultures. Twenty-four cases were followed up for a year. Two thirds of these had remained free from recurrence without further treatment. It is felt that penicillin ointment offers a hopeful form of treatment for marginal blepharitis. (4 tables.) Edna M. Reynolds.

Hughes, W. L. **Total reconstruction of the upper lid (blepharopoiesis).** *Amer. Jour. Ophth.*, 1945, v. 28, Sept., pp. 980-992. (25 figures.)

Lytton, H. **Subcutaneous splitting of the lid in the operative treatment of senile ectropion.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 378-380.

To avoid splitting the lid margin in the Kuhnt-Szymanowski operation, a method of subcutaneous splitting is suggested. The skin-muscle layer is separated from the tarsoconjunctival layer with angular scissors introduced through an incision at the outer canthus. The splitting is extended up immediately under the lid margin, keeping close to the anterior surface of the tarsus.

Two mattress sutures are inserted into the anterior layer of the lid near its margin. These sutures are used to lift the skin. The tarsal plate is drawn downward and inward by two Snellen sutures. The lateral incision is completed to the excision of the Kuhnt-Szymanowski triangle. The lifting sutures are fastened above the eyebrow and the Snellen sutures are tied in the usual way. (3 diagrams).

Edna M. Reynolds.

Pierose, P., and Butt, E. **Edema of the eyelids in trichinosis.** *California and Western Med.*, 1945, v. 62, April, p. 174.

So far, the commonly held view that "edema of the eyelids in trichinosis is due to the presence of trichinae in the extraocular muscles" lacks sufficient supportive evidence and must therefore be considered an assumption. The author advances the concept that edema of the eyelids as it occurs in trichinosis may be principally a non-specific toxic manifestation not entirely due to the presence of trichinae in the extraocular muscles or other tissues around the eyes. Two instances of trichinosis of the extraocular muscles

occurring in 11 unselected patients investigated are reported and illustrated. Trichinae were demonstrated in six of the 11 bodies. In none of these patients had clinical symptoms of trichinosis been recorded.

Theodore M. Shapira.

Shimkin, N. I. **Two rare cases of homoplastic surgery of the eyelids.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 363-369.

In a case of posttrachomatous trichiasis in a hemophilic youth, grafting with a transplant from the mucosa of the lower lip of the patient was followed by severe hemorrhage, the patient having withheld the information that he suffered from hereditary hemophilia. But it was found that his father's blood would coagulate the patient's blood, and a mucous graft from the father's lower lip was used with success.

In a case of congenital ichthyosis ectropion with all four lids involved in a child aged 13 months, whole-skin grafts from the mother's forearm were placed in the child's lids. In view of the fact that the patient's pulse became arrhythmic during the operation, the grafting of the left lower lid was postponed. Seven weeks after operation the corrected lids were functioning perfectly. (2 figures, references.)

Edna M. Reynolds.

Tinoco, Joaquim. **Streptothrix of the lacrimal passages.** *Rev. Brasileira de Oft.*, 1945, v. 3, June, pp. 207-209.

The author reports the case of a physician aged 85 years, in whom chronic conjunctivitis had existed for three years. The large mass of concretions evacuated by incision with the

Bowman knife contained streptothrix and other organisms. (References.)

W. H. Crisp.

## 15

### TUMORS

Roethth, Andreas de. **Treatment of bilateral retinoblastoma.** Northwest Med., 1944, v. 43, Dec., p. 364.

The right eye of a four-year-old girl was removed for retinoblastoma. The left eye showed a flat gray elevation, 5 by 2.5 disc diameters in area, at the macular region, and a second grayish-white protruding mass far in the periphery at the 7-o'clock position. By roentgenography three small kidney-shaped chalky-white areas were shown within the detachment. The patient was sent for X-ray treatment, and received 15,200 r equally divided between the temporal and nasal portals. The calcium foci steadily increased during treatment, and there are now 12 foci present. An area of choroidal atrophy surrounds the tumor. V. is 20/70.

A second method of treatment is electrocoagulation by Weve's method. The author observed two cases treated by this method. The electrode was introduced through the sclera into the tumor 55 times for two or three seconds each time, using 50 to 60 milliamperes. One case treated by this method was arrested at first but showed advance after five months. The second case was arrested and apparently cured.

R. Grunfeld.

Santos, E. and Deik, S. **Radiotherapy in the treatment of retinal glioma.** Arch. Chilenos de Oft., 1944, v. 1, Sept.-Oct., pp. 11-14.

In two children, aged respectively four and eighteen months, and in whom one eye had already been enucleated

on account of glioma, the technique recommended by Martin and Reese was resorted to, fractional doses being used in four or five series in the course of a year. The radiation was administered by three portals of entry, temporal on the same side and supraorbital and nasal on the opposite side. In the first case, after primary swelling of the tumor, gradual and complete destruction of the tumor was observed, with preservation of vision as demonstrated by the fact that the child walked perfectly and confidently took hold of objects placed in its reach. There was no general or local change attributable to the treatment, and at the age of sixteen months the child weighed thirty pounds. In the second case, in a shorter period of observation, the vision had not changed, complications had not been observed, and after two years of radiation there was definite indication of disintegration of the growth. (3 figures.)

W. H. Crisp.

## 16

### INJURIES

Baltin, M. M. **X-ray therapy of traumatic iridocyclitis.** Viestnik Oft., 1943, v. 22, pt. 6, p. 6.

On the basis of experience with 24 cases of serious traumatic iridocyclitis, Hessberg's method of treating them is considered justified. Enucleation may always be performed later, if therapy fails. Small doses of medium-soft rays, three or four applications at five or six-day intervals, were found to relieve pain, reduce inflammation, and shorten treatment. The acute early cases fare best, ten of the author's cases having been definitely benefited. Among the cases not benefited were seven with overlooked intraocular foreign bodies. Four of the intraocular foreign bodies



were later extracted, three being amag-netic. Atropine and milk injections were also used. No erythema was produced nor corneal opacities noted. The dosage formula is: 120 kv., 4 ma., 30-cm. focus, 3-mm. Al filter, 50 to 100 r.

M. Davidson.

Bokstein, F. S. **The special problems in the diagnosis and therapy of gunshot injuries.** *Viestnik Oft.*, 1943, v. 22, pt. 6, p. 11.

Dacryocystitis after gunshot injury of the face is often overlooked, because of the other widespread lesions and the difficulty of making the diagnosis. The writer found it in 24 out of 62 injuries that came under his observation. While the lacrimal passages are normally so well protected that they are not injured in connection with the numerous operations performed on the sinuses or with nasal fractures, they are often injured in gunshot wounds. The fistulous tract sometimes opens into nose or antrum, and a sinus origin is assumed. In one case the fistula opened below the outer canthus, and an osteomyelitic process was simulated. The correct diagnosis was made only after six months, by instilling collargol into the conjunctival sac. The presence of pneumococci and mucus is helpful in the diagnosis. Extirpation of the sac is not effective in these cases, because of the diverticula and ectasias. A rhinostomy is necessary, without the usual sutures and with a large opening into the nose. The sac may be removed at the same time. As long as the lacrimal canaliculi are intact the results are good. Nasal atresia may have to be taken care of first.

M. Davidson.

Crawford, R. A. D. **Repair of perforating corneal wounds.** *The Lancet*, 1945, March 24, p. 366.

Direct suturing of the corneal wound is preferable to covering the wound with a raised conjunctival flap. Corneal suture gives a firmly healed scar with a low degree of astigmatism. Rapid restoration of the anterior chamber reduces the incidence of anterior synechia, and inflammation is minimal and the prognosis easy to assess. There is no risk of late infection. A large conjunctival flap, however, causes the eye to remain red and irritable for a long time, and it is difficult to judge whether the irritation is due to the injury or to the operation. If retraction of the conjunctival flap is delayed, observation of the cornea is difficult.

R. Grunfeld.

Fisher, J. A. **Severe laceration of only eye with recovery of useful sight.** *Amer. Jour. Ophth.*, 1945, v. 28, Sept., pp. 1014-1015.

Ivanova, E. M. **Case report of late tetanus.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 38.

In the literature 83 cases of tetanus observed after eye injury are reported. This condition is presumably due to encapsulation of spores. The case now reported is of hydrochloric-acid burn in 1924 which left the worker blind with bilateral symblepharon and ankyloblepharon, for which plastic operations were undertaken in 1939, preliminary to keratoplasties, and in which tetanus followed radical plastic operation. The patient recovered. Notable among the symptoms, and also reported in connection with similar cases in the literature, is the occurrence of facial weakness and oculomotor paresis before and synchronous with the convulsive seizures.

M. Davidson.

Kolen, A. A. **A few methods of plastic surgery in war injuries of the eyes.** *Viestnik Oft.*, 1943, v. 22, pt. 6, p. 3.

The most frequent plastic operation around the eyes is that on the lids, and the most serious problem is their reconstruction. The Filatov round pedicled skin-flap is suitable for the repair of very large defects combined with osseous destruction, but is complicated and long-drawn out, because of the long series of trans migrations it often has to undergo. It also requires a very large flap to insure its viability. A modification of this flap is here described under the name of "microflap." It is taken from the face and is only about one-half inch wide. Its length is outlined in two equal segments, displaced with reference to each other, so that instead of the flap being rolled and sutured lengthwise, as in the original Filatov method, the two segments are folded against each other, by first sectioning the peripheral end of one, and are sutured side to side to make a roll. The denuded area is thus narrower and the sutures do not tear out so readily. For restoration of the lower lid the flap is made longer than necessary to fill the gap, and the two ends are denuded of epidermis and slipped through a tunnel at one end and into a pocket at the other end of the gap. This provides for securer fixation of the new lid. A method described for correcting the milder cicatricial ectropions is said to tend to prevent recurrence by pull of the new scars. It consists in shaping the two triangles of Limberg so that their sides are very convex downward. The upper triangle is slid into place and its apex brought up to the dorsum of the nose. A third procedure is described for raising or lowering displaced canthi. (Illustrated).

M. Davidson.

Kolen, A. A. **Some points in the conservative and surgical treatment of war injuries of the eyes.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 14.

Experience at the Novosibirsk Evacuation Hospital Eye Clinic is summarized as follows: Enucleation and evisceration are the most common eye operations in war. Retrobulbar anesthesia for evisceration is dangerous in view of the most common indications for it, namely panophthalmitis. Direct injection into the ciliary body, 1 to 1.5 mm. from the limbus, guiding the needle obliquely backward and penetrating 1 to 1.5 mm. at both the 3 and the 9-o'clock positions, has been found very satisfactory. Ablation of the cornea is best done 1 to 1.5 mm. beyond the limbus, and instead of a Bunge spoon a spatula is used for separation of the contents from the sclera. In dealing with nervous injured soldiers 1-percent novocaine has been found too weak, and a quantity as high as 8 to 10 cc. of a 2-percent solution is necessary for enucleation. The pain of muscle section due to traction has been obviated by using a strabismus hook with an inner cutting edge extending 18 mm. from the tip, and severing insertions by a see-saw motion, without forceps or scissors. Vitreous opacities have greatly benefited from blood transfusion combined with simultaneous puncture of the anterior chamber, and the effect observed has been much better than from blood transfusions alone. On the other hand, the presence of iridocyclitis is a contraindication to paracentesis, and blood transfusion alone is indicated in such a case.

M. Davidson.

Kolychev, N. N. **Kuhnt's keratoplasty in war injuries of the globe.** *Viestnik Oft.*, 1943, v. 22, pt. 5, p. 44.

In reviewing the material at an evacuation hospital in 1939, the author found that, because of unfavorable conditions for making an accurate examination in the field, intraocular foreign bodies had been retained in 14 out of 42 perforating globe injuries in which a Kuhnt operation had been done. In nine of these cases the foreign body was removed at an evacuation hospital; three by the anterior route and six by the posterior route. Of the eyes operated upon, three had to be enucleated, and one eviscerated. Of the eyes retained, the majority had useful vision, so that the operation is considered as having accomplished a useful purpose.

M. Davidson.

Newson, A. L., and Armstrong, K. B. **A case of burns associated with bilateral retinitis.** *Med. Jour. Australia*, 1945, v. 1, May 5, p. 459.

A soldier received an extensive second-degree burn by accidental ignition of low-octane gas. Toxemic symptoms developed on the second and third days. On the second day of illness the patient complained of blurred vision, and this persisted. When the vision was tested two weeks later he could count with each eye merely fingers at four feet distance. In each eye the macula was surrounded by a large white area somewhat similar to that seen in malignant hypertension. In the center of the area was a dull-red spot. Five to six smaller patches were scattered over the posterior portion of each fundus, but only one small hemorrhage was seen. A month later vision had improved to 6/36 in each eye. The peripheral patches had been largely absorbed and those around the macula were in course of absorption.

R. Grunfeld.

Preobrajenskaya, M. N. **A survey of the nature of eye injuries in the present war.** *Viestnik Oft.*, 1943, v. 22, pt. 6, p. 17.

A plan, with tabulating cards and report forms, is proposed for statistical analyses of eye injuries by the Helmholtz Central Ophthalmologic Institute. In the meantime, on the basis of three hundred cases analyzed at the evacuation hospital of the Institute, where the injured are received one to three months after injury, results are stated as follows: 33 percent, with anophthalmos, came in for plastic work; 17 percent came in with intraocular damage, mainly from contusion; 13.6 percent with iridocyclitis due to perforating injury; 7.5 percent with atrophied globes for enucleation and prothesis; 5.4 percent with leucoma; 6.5 percent with intraocular foreign bodies for extraction; the rest not specified. The statistics for the field hospitals and stations are of course different. Most of the eye injuries are the results of mine explosions. Bullets account for 20 percent only. Isolated eye injuries are rare, being less than half of the total. Perforating injuries are more common in this war than in the previous one. Bilateral eye injuries are also more common.

M. Davidson.

Rosen, Emanuel. **An unusual type of anterior traumatic capsular cataract.** *Brit. Jour. Ophth.*, 1945, v. 29, July, pp. 373-374.

Anterior traumatic capsular cataract followed a penetrating injury. The anterior capsule of the lens presented an elongated white scar from which several folds radiated. The question is raised whether these radiating folds were merely wrinkles in the hyaloid membrane or epithelial proliferation

upon the lens capsule. (2 slitlamp photographs.) Edna M. Reynolds.

Rosen, Emanuel. **Traumatic lenticonus posterior.** Brit. Jour. Ophth., 1945, v. 29, July, pp. 370-373.

Two cases of traumatic lenticonus posterior are reported. Case 1 followed a penetrating injury. A dense white deposit was seen in the posterior cortex, as well as many small white round salt-like deposits very much resembling stars in the sky. The posterior capsule seemed to bulge posteriorly and the vitreous also seemed to partake of the star formation.

In case 2, the center of the posterior capsule of the lens also showed prominent bowing posteriorly. In this case, the posterior capsule appeared to be rolled up upon itself in two regions and gave the appearance of glasslike tubings. It is possible that in this case trauma produced a process similar to lamellar separation, allowing the capsule to roll up on itself and the region between the "tubes" to herniate because of its lack of resistance.

A third case of traumatic lenticonus posterior is mentioned but could not be photographed. (3 slitlamp photographs, references.) Edna M. Reynolds.

Rychener, R. O. **The management of traumatic hyphemia.** Sec. on Ophth. Amer. Med. Assoc., 1944, 94th mtg., pp. 38-43.

Citing briefly a number of illustrative cases, the author suggests that traumatic hyphemia may frequently be controlled by simple paracentesis of the cornea, without irrigation of the anterior chamber. Miotics are possibly more beneficial than mydriatics. Paracentesis should be used without delay in the presence of an increase of intraocular pressure, or when no clear

aqueous is visible in the anterior chamber. (References.) W. H. Crisp.

Thorpe, H. E. **Nonmagnetic intraocular foreign bodies.** Sec. on Ophth. Amer. Med. Assoc., 1944, 94th mtg., pp. 87-107.

The subject is reviewed thoroughly under the headings of history, clinical examination, X-ray localization, the Berman locator, preparation of the patient for surgery, cornea, anterior chamber, chamber angle, iris, lens, foreign body in posterior aqueous chamber, nonmagnetic particle in ciliary body, foreign body in vitreous, vitreous approached by various methods, scleral foreign bodies, and sympathetic ophthalmia. The number of nonmagnetic foreign bodies encountered both in industry and in warfare has increased.

The author favors Comberg's contact-lens method of X-ray localization, which he has recently modified by the drilling of suture holes near the edge of the glass, so that it may be anchored with episcleral sutures. Surgical details are given for removal of foreign bodies in various parts of the eye, including the author's instrument for endoscopic removal of intravitreal nonmagnetic foreign bodies. Emphasis is laid on the necessity for avoiding mutilation of the eye in the attempt to remove a foreign body which might prove inert and harmless. (14 drawings.)

W. H. Crisp.

Whitsell, F. M. **Treatment of ocular injuries among combat troops.** Texas State Jour. Med., 1945, v. 40, April, p. 646.

This is a review of recent literature. Topics dealt with include the use of a conjunctival flap to cover a perforated cornea, delayed absorption of anterior



or posterior hemorrhages, intraocular nonmagnetic foreign bodies, and thermal and chemical burns.

R. Grunfeld.

17

SYSTEMIC DISEASES AND PARASITES

Jones, I. H., Muckleston, H. S., Lewis, E. R., and Owen, G. R. **Vitamins and the eye, ear, nose, and throat.** The Laryngoscope, 1944, v. 54, Nov., pp. 628-657.

This is a survey on the subject of vitamins and related problems in general and local metabolism. Any gross deficiency gives obvious signs, as in pellagra. To detect moderate deficiency, however, the clinician must depend on more or less indefinite signs plus laboratory findings. Each germ layer demands an oil-soluble or a water-soluble vitamin. The ectoderm and the endoderm require A and B complex, the mesoderm requires C and D vitamins. This concept affords a rational approach to therapy.

When raw material is assimilated by the cell it becomes living tissue under the influence of activators, intrinsic activators which are the endocrines, and extrinsic which are the vitamins. Cod-liver oil was found to heal keratomalacia, showing that the corresponding vitamins are important in the metabolism of cornea. Cataract appears in rats as a result of diet deficient in B<sub>2</sub>. In the retina, deficiency of C, K, or P vitamin will produce capillary hemorrhages.

Experience with 97 patients suggests that lack of B<sub>2</sub> is the cause of vernal conjunctivitis. M. Lombardo.

Liang, S. C. **Thelaziasis of the conjunctiva.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 70.

A case of invasion of the conjunctiva by thelazias, a genus of nematodes allied to the filarias, is reported in a 24-year-old Chinese male. He had no subjective symptoms and the discovery of the nematodes was accidental, in the course of a routine examination. A body resembling a mass of discharge was seen moving in the lower conjunctival fornix. Six worms were easily extracted, averaging 10 to 15 mm. in length. The source of infestation was not determined but was probably either canine or feline. (References.)

Edna M. Reynolds.

Martini Z., Italo. **Intraorbital hydatid cyst.** Arch. Chilenos de Oft., 1944, v. 1, July-Aug., pp. 17-22. (See Section 13, Eyeball and orbit.)

Messinger, H. C. **Eye signs in two hundred diabetics.** Rhode Island Med. Jour., 1944, v. 27, Dec., p. 643.

Among two hundred diabetics, 49 men and 151 women, who came for relief of symptoms referred to the eyes, the majority had retinal defects, 86 had cataract, 8 had muscle paralyses, 9 had glaucoma, and one had melanoma of the choroid. The average age was 61 years, but there were 11 persons less than 40 years old. Five had only refractive errors. Four had severe retinal hemorrhage with considerable loss of visual acuity; one had subcapsular cataract; and one had interstitial keratitis due to congenital syphilis, with a 4+ Wassermann. R. Grunfeld.

Pierose, P., and Butt, E. **Edema of the eyelids in trichinosis.** California and Western Med., 1945, v. 62, April p. 174. (See Section 14, Eyelids and lacrimal apparatus.)

Reeh, M. J. **Ocular complications of**

**certain tropical diseases.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 958-964. (6 figures, references.)

## 18

HYGIENE, SOCIOLOGY, EDUCATION,  
AND HISTORY

Bushmich, D. G. **Organization of mass rehabilitation of potential recruits.** Viestnik Oft., 1943, v. 22, pt. 6, p. 23.

In spite of previous efforts by the Soviet Government to eradicate trachoma among the children in Turkmenia, a high incidence of it was still found among the youth subject to the draft. Organized efforts to reach the cases were started in 1932, but until 1937 only about 10 percent of the trachomatous were cured. In 1937 a new procedure including educational-curative centers with hospital beds for intensive treatment, by the Filatov method of expression every two weeks, was found very effective, and 70 percent of the cases were cured by 1942. There were 16 such centers with 1,300 beds. In one center 90 percent were thus cured. Between expressions, daily local massage was employed with varying agents. Many of the centers paid for themselves by the occupational therapy in the form of gardening. Political indoctrination was also a part of the two to three months concentration program. The assembling of the youth was facilitated by use of a special medical passport on which treatment and results were noted.

M. Davidson.

Chan, Eugene. **A statistical study of trachoma among in-patients.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 93.

Statistical data on the incidence and

sequelae of trachoma among 1,025 in-patients of the Chengtu Eye, Ear, Nose, and Throat Hospital for 1938 and 1939 are presented. The high incidence of keratitis as well as trichiasis and entropion in stage-III trachoma is brought out. Trichiasis and entropion were found to occur bilaterally in the majority of cases. Trachoma occurred in 32.2 percent of the patients. (11 tables.)  
Edna M. Reynolds.

Chi, Hsiu-Hsiang. **A statistical study of trachoma among in-patients.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 73.

Among 2,903 patients admitted to the Department of Ophthalmology of the Chengtu Eye, Ear, Nose, and Throat Hospital from January, 1940, to December, 1943, 44.9 percent had trachoma. The highest incidence of infection occurred in the age groups between 16 and 40 years. The majority of patients had trachoma III and over 80 percent showed corneal lesions. (8 tables, references.)

Edna M. Reynolds.

Perret, A. **Ophthalmology in Venezuela.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 1018-1020. (References.)

Shen, D. S. **Investigation of blindness in West China.** Chinese Med. Jour., 1945, v. 63A, Jan., p. 62.

An analysis of 1,130 blind eyes in 748 patients investigated during a four-year period is presented. Trachoma was responsible for blindness in 438 eyes. Ulcerative keratitis from various causes caused blindness in 158 eyes. Thirty-one of these eyes also had trachoma. Keratomalacia was the cause of blindness in 51 patients (90 eyes), the majority being in children under ten years of age. Only six patients were adults.

Gonorrheal infection was responsible for blindness in one hundred eyes, many babies having been delivered by untrained midwives. Small-pox and hereditary defects are not frequent factors in the causation of blindness in West China. (2 tables, references.)

Edna M. Reynolds.

## 19

## ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Haden, H. C. **Concerning the similarity of the developing retina and brain wall in human embryos.** Amer. Jour. Ophth., 1945, v. 28, Sept., pp. 943-957. (19 photographs, references.)

## PAN-AMERICAN NOTES

Edited by DR. M. URIBE TRONCOSO  
500 WEST END AVENUE, NEW YORK 24

Communications should reach the Editor by the Twelfth of the month

## MISCELLANEOUS

**Mexico.** The Association for the Prevention of Blindness in Mexico held its second annual "Ophthalmological Week" from August 13th to 18th. The meetings were held in the hospital which the Association maintains in Mexico City. Clinical demonstrations and operations were also held.

United States of America Project of the National Research Council.

The present war has intensified the problem of obtaining the indispensable material for research work for the scientists of the American Republics. Transportation of this material has become very costly and even impossible.

In the hope of solving this problem, at least in part, the National Research Council together with the library of the Department of Agriculture of the U.S.A. and other entities interested in the other American Republics has begun a service by which any man of science or scientific institution in Latin America can receive free of charge, photographic reproductions on microfilm of any materials needed for their work. Microfilm can be read with any apparatus which projects slides onto the wall, or with special machines for the projection of microfilm.

Besides articles from journals and extracts from books, the National Research Council is willing to prepare bibliographies, look up available material on any scientific subject, or answer any requests sent them by any person or scientific institution which has received them directly and is unable to supply them. If a person wishes the material to be sent by airmail, the Council asks them to send together with the request an international postal order for the airmail postage; otherwise the material will be sent by ordinary mail without charge.

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## SOCIETIES

**Argentina.** The Argentine Society of Ophthalmology held a meeting on July 18th at which the following papers were read and discussed: "Diagnosis of the earlier symptoms of glaucoma" by Drs. Flaminio Vidal and Jorge L. Malbran; "A dynamic ophthalmotonus and ocular trauma" by Drs. Flaminio Vidal and Moises Brodsky; "Disturbances of the hypophysis and their treatment by the gonadotro-

phine from serum" by Dr. Justo Lijo Pavia; "Three cases of congenital aniridia" by Drs. J. Lijo Pavia and Rodolfo Lachman.

*Mexico.* The Mexican Ophthalmologists Society appointed the following members to the board of directors of the Society for this year: Dr. Pedro Berruero, president; Dr. Carlos Tapia, secretary; Dr. J. Martinez Hinojosa, treasurer.

#### PERSONALS

*Brazil.* Dr. R. Busacca of São Paulo, Brazil, gave a course on the premises of the Argentine Society of Ophthalmology in May. The subjects were: "Pathology and clinical manifestations of corneal diseases." One lesson was devoted to corneal lesions due to the epitheliotropus virus.

The Moura Brazil Prize for 1944 was awarded to Dr. Francisco Amendola, of São Paulo, for his work on "Ocular pemphigus."

The prize, "Sociedade de Oftalmologia de São Paulo," instituted some years ago by Prof. Moacyr E. Alvaro, was awarded for the first time this year. It is to be awarded annually to the physician who, having graduated from medical school the previous year, has shown the greatest ability in ophthalmology. The 1944 prize was awarded to Dr. Rubens Belfort, de Mattos.

The prize, "Presidente de Sociedade de Oftalmologia de São Paula" is awarded yearly to the author or authors of the best papers pre-

sented at the monthly meetings of the Society. This year it was unanimously decided to divide the prize into two equal parts, one to be awarded for the best review on a subject and the other for the best paper on research. The first was given to Dr. J. Mendonca de Barros for his papers on "Ocular tuberculosis" and "Arterial hypertension as related to ophthalmology." The prize for research went to Dr. Antonio de Almeida for his papers on "The examination of the fundus oculi in newborn infants as an aid to diagnosis" and "Orbital tumors."

Dr. Silvio Abreu Fialho, of Rio de Janeiro, was elected a member of the National (Brazilian) Academy of Medicine.

*Guatemala.* Dr. William B. Clark, professor of ophthalmology, Tulane University, of New Orleans, Louisiana, has just returned from Yepocapa, Guatemala, where he spent six weeks instituting a research project to study the causes of blindness in patients infected with onchocerciasis in Guatemala. This project is sponsored jointly by the Caribbean Sector of the Pan-American Sanitary Bureau and the Department of Health of Guatemala. The project is being continued in Dr. Clark's absence, by Dr. Bertha Riveroll Noble, of Mexico City, D.F., who was a former Pan-American Kellogg Foundation Fellow in Ophthalmology at Tulane University from 1943 to 1945. Dr. Clark will return to Guatemala in January, 1946, to close out or continue the project as the results of the investigation justify.



## NEWS ITEMS

Edited by DR. DONALD J. LYLE  
904 Carew Tower, Cincinnati 2

News items should reach the editor by the twelfth of the month.

### DEATHS

Dr. Donald A. Bartley, Indianapolis, Indiana, died June 16, 1945, aged 58 years.

Dr. Michael V. Ball, Warren, Pennsylvania, died May 26, 1945, aged 77 years.

Dr. Erastus T. Farrens, Clarinda, Iowa, died June 2, 1945, aged 89 years.

Dr. Clarence F. Fowler, Galveston, Texas, died June 30, 1945, aged 30 years.

Dr. Lawrence C. Ingram, Orlando, Florida, died July 2, 1945, aged 72 years.

Dr. Harry A. Seigall, Hartford, Connecticut, died June 29, 1945, aged 54 years.

Dr. Benjamin F. Steely, Louisville, Illinois, died May 18, 1945, aged 64 years.

Dr. Alonzo C. Ward, Osceola, Missouri, died May 28, 1945, aged 89 years.

### MISCELLANEOUS

The Pan-American Airways System is offering a 15 percent reduction on fares to delegates attending the Pan-American Congress of Ophthalmology meeting at Montevideo.

The fare from Miami to Montevideo is \$486.00 one way; \$874.80 round trip if traveling via the East Coast; \$504.00 one way; \$907.20 round trip if traveling via the West Coast.

For any delegate who may be interested in making a circle trip around South America the fare will be \$891.00.

All these fares are subject to 15 percent U. S. transportation tax. However, as mentioned above, these fares are also subject to 15 percent discount.

### PERSONALS

Among the speakers at the conference on industrial health problems sponsored by the industrial hygiene bureau of the Pennsylvania Department of Health was Dr. Charles F. Kutscher of Pittsburgh. This conference was held September 25th and 26th at the Benjamin Franklin Hotel at Philadelphia. The title of Dr. Kutscher's paper was "Industrial ophthalmology."

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